

# HIV/AIDS IN ASIA AND THE PACIFIC REGION



**WORLD HEALTH ORGANIZATION**

**2001**

**Regional Office for South-East Asia**  
New Delhi, India

**Regional Office for the Western Pacific**  
Manila, Philippines

WHO Library Cataloguing in Publication Data

HIV/AIDS in Asia and the Pacific Region

1. Sexually transmitted infections - prevention and control. 2. Epidemiology.

I. World Health Organization. Regional Offices for the Western Pacific and for South-East Asia.

ISBN 929061 158 8

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## PREFACE

*The priority in the Asia Pacific region is to implement HIV interventions among those sections of the population with high-risk behaviour, such as sex workers and their clients, injecting drug users, and migrant workers.*

Although the HIV epidemic is still at an early stage in many countries in the Asia Pacific region, it poses a very serious health and developmental problem. Given the size of the population in the region, representing 60% of the world's people, the potential for epidemic growth is very real. Since the extensive spread of HIV began at the end of the 1980s, more than 6 million people in the region have become infected. In the year 2000 alone, it is estimated that more than 500 000 died of AIDS in Asia – about 1500 a day.

Experience has shown that prevention and intervention activities can successfully bring about reductions in HIV prevalence, provided they are combined with high-level political commitment and leadership. The priority in the Asia Pacific region is to implement HIV interventions among those sections of the population with high-risk behaviour, such as sex workers and their clients, injecting drug users, and migrant workers. There are many success stories, such as in Thailand and Cambodia, where condom promotion activities have brought about behavioural changes and a subsequent reduction in HIV prevalence and incidence – a major achievement. There are, however, still many areas of concern. Interventions are needed urgently to prevent HIV relating to injecting drug use and high risk sexual behaviour and to scale up the coverage of these interventions so that they have nation-wide impact on the HIV prevalence.

Very few countries with limited resources have been able to reduce HIV transmission, but, where activities have been successful, they have been guided by adequate epidemiological knowledge. In planning any intervention, it is necessary to develop an evidence base of relevant data. This joint SEARO/WPRO report on HIV in the Asia Pacific region is an attempt in that direction. This is the first such report on which two WHO regional offices have worked together, and augurs well for future collaboration between the two regions, particularly in the area of HIV/AIDS. Within the framework of UNAIDS, WHO plays a leading role in the health sector response to HIV/AIDS. Within that context, collecting data and analysing the current status and future prospects for HIV/AIDS, including its implications, is an important priority for WHO. We hope that this report will contribute to a better understanding of the epidemic in the Asia Pacific region and that countries will use the information it contains to guide them in better responding to the HIV/AIDS epidemic.

Thanks to the commitment of ministries of health, and with support from WHO, most Asia Pacific countries have improved their surveillance systems in the past five years, and we now have more reliable data on the extent, trends and determinants of the HIV epidemic in the region. We are also able to measure the impact of interventions and to properly guide public health decisions concerning HIV/AIDS. If we now use that knowledge to select the most appropriate interventions, we can make a difference.



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## ACKNOWLEDGEMENTS

The Western Pacific Regional Office and the South-East Asia Regional Office of the World Health Organization would like to thank the epidemiologists and experts who have generated and shared the results of surveillance activities, with particular thanks to Dr. James Chin, for his contribution to this document.

## ABBREVIATIONS AND ACRONYMS

AIDS	acquired immune deficiency syndrome
ANC	antenatal clinic attendees
BSS	behavioural surveillance survey
CDC	Centers for Disease Control and Prevention
DOH	Department of Health
FSW	female sex workers
GDP	gross domestic product
GNP	gross national product
GPA	Global Programme on AIDS
HAART	highly active anti-retroviral therapy
HIV	human immunodeficiency virus
HSS	HIV sentinel surveillance
IDU	injecting drug users
MOH	Ministry of Health
MSM	men who have sex with men
NGO	non governmental organization
NGU	non-gonococcal urethritis
RBG	risk-behaviour groups
RFSW	registered female sex workers
SHC	social hygiene clinic
STD	sexually transmitted disease
STI	sexually transmitted infection
SW	sex workers
UNAIDS	Joint United Nations Programme on HIV/AIDS
UNDP	United Nations Development Programme

# 1 HIV/AIDS in Asia and the Pacific Region

## Introduction



The Asia Pacific region is vast and diverse. In addition to countries with varied epidemiological patterns of human immunodeficiency virus and acquired immunodeficiency syndrome (HIV/AIDS) – high versus low HIV prevalence countries and different predominant HIV risk behaviour(s) – countries in the region also have extremely diverse capabilities to develop and support public health prevention and control programmes. In reviewing the current epidemiology of HIV/AIDS in Asia, this diversity needs to be fully appreciated.

*As of 2001, HIV prevalence in most Asia Pacific countries remains low, but there are major public health concerns regarding the future growth potential of HIV/AIDS in the region.*

Understanding of the many diverse HIV epidemics and their determinants in the Asia-Pacific Region has improved substantially over the past 3-5 years, as a number of countries have implemented comprehensive surveillance systems for HIV prevalence, as well as sexual and injecting risk behaviours. As of 2001, HIV prevalence in most Asia Pacific countries remains low, but there are major public health concerns regarding the future growth potential of HIV/AIDS in the region. This vast region, with a population of nearly 3.5 billion in the most sexually active age group (15-49 years) – representing nearly 60% of the world's population – has the potential, because of its sheer size, to significantly influence the course and overall impact of the HIV/AIDS pandemic.

This report presents an overview of the HIV/AIDS pandemic and a more detailed description of the epidemiology of HIV/AIDS in the Asia Pacific region.

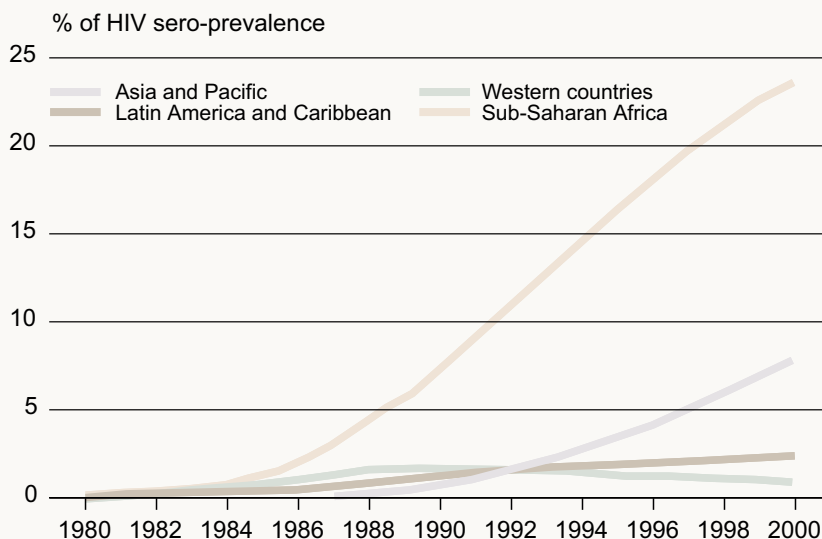
## The HIV/AIDS pandemic

Figure 1 shows the estimated temporal distribution of HIV prevalence in four of the major "regions" in the world. North American countries and countries in Western Europe, Australia and New Zealand are combined into a grouping of "Western countries". Globally, only small numbers of HIV infections are estimated to have occurred during the late 1970s and early 1980s. The increasing HIV prevalence in sub-Saharan Africa during the 1990s is clearly evident in this figure. HIV was introduced into Asia Pacific countries during the early to mid-1980s, and by the early 1990s the increasing spread of HIV in the region was also clearly evident.

As of mid-2001, the HIV/AIDS pandemic comprises many separate and basically independent epidemics, each involving different modes of HIV transmission and each developing at separate times and in different countries. Even within countries, HIV epidemics have primarily been localized and diverse. What appeared about two decades ago to be focal epidemics in industrialized countries that mainly involved men who were having sex with other men (MSM) and injecting drug users (IDU), has evolved into a more complex pandemic. HIV/AIDS is currently endemic at varying, but usually high, prevalence levels among MSM in most regions of the world. Explosive spread of HIV still occurs within pockets of susceptible IDU populations worldwide and sexual transmission occurs throughout the world among both males and females who have unprotected sex with multiple partners. However, extensive heterosexual spread of HIV has occurred



**FIGURE 1:**  
Estimated regional  
HIV prevalence  
trends



predominantly only in sub-Saharan African countries, a few countries in the Caribbean and in Central America, and a few countries in south and south-east Asia.

## HIV/AIDS in Asia

HIV/AIDS in Asia was first detected in the early to mid-1980s. Initial AIDS cases were detected among MSM in several Asia Pacific countries such as Australia, Japan, Malaysia, New Zealand, Singapore, and Hong Kong during the early 1980s. A relatively extensive spread of HIV occurred in MSM sex networks in these Asia Pacific countries and such transmission probably peaked during the mid-to-late 1980s.

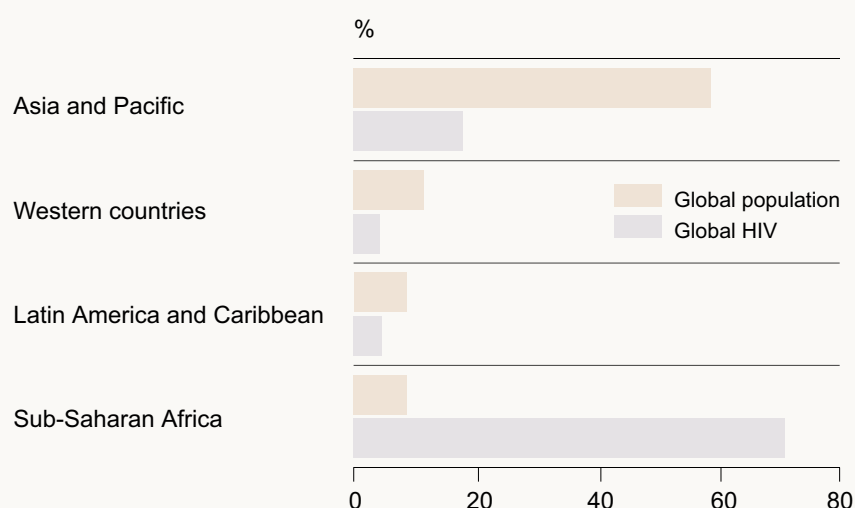
By the mid-to-late 1980s, it became evident that transmission of HIV was also increasing among other major HIV-risk behaviour groups in Asia. High HIV prevalence (up to 50% or more) was documented among female sex workers (FSW) in Thailand and in parts of India, notably Mumbai (Bombay), during the mid-to-late 1980s. In addition, intense focal HIV epidemics were documented in Thailand, parts of northeast India, and the "golden triangle" area (where the borders of China, Myanmar and Thailand meet) in IDU populations beginning around the mid-to-late 1980s.

During the 1990s, in several south and south-east Asian countries (Cambodia, parts of India, Myanmar and Thailand), significant heterosexual transmission of HIV continued or was first noted, primarily from FSW to their male clients, and then from those infected males to their regular sex partners. An explosive spread of HIV within IDU populations, which can lead to infection levels of over 50% within a year or two, continued to occur in several provinces of China, north-east India, Malaysia, Myanmar, Pakistan, Thailand and Viet Nam, and most recently, in the late 1990s, in Indonesia and Nepal. Although HIV can spread rapidly among IDUs who share contaminated injecting equipment, and from them to their sex partners, these epidemics have, so far, resulted only in limited spread of HIV to the heterosexual population at large. The highest HIV prevalence rate reached in a few Asian countries with extensive heterosexual HIV transmission has only been about one tenth of the highest prevalence rates found in some sub-Saharan African countries.

In Asia Pacific countries with a measurable HIV prevalence rate, the prominent risk behavioural groups are FSW and/or IDU. As a result, there is usually a marked male preponderance of HIV infections compared with female infections. This is because most IDU are male, and the epidemiology of FSW and their male clients in most Asian countries also results in a preponderance of infected males. A relatively small "core" group of highly exposed FSW can develop very high HIV infection rates and transmit infection to their many male clients. This accounts for the very large male preponderance of HIV infections in the early phase of a heterosexual HIV epidemic in Asia Pacific countries. In the latter phases of an Asian heterosexual HIV epidemic, the male to female ratio begins to decrease as infected males begin to infect their regular female sex partners (i.e., their wives or girl friends).

By the beginning of the new millennium, the Asia Pacific region had less than 20% of the estimated HIV infections in the 15-49 year old population, as shown in Figure 2. The estimated adult HIV prevalence rates in the region varied from almost zero (Democratic People's Republic of Korea) to 2-3% in Cambodia, Myanmar, Thailand, and in several major states in India.

**FIGURE 2:**  
Estimated  
distribution of adult  
HIV infection and  
population, 2000



From a regional perspective, the magnitude and short-term trends of HIV in Asia Pacific countries are and will continue to be dependent largely on the success of HIV prevention and control programmes, essentially in countries:

- 1 where the extensive heterosexual HIV transmission is occurring, especially in those countries with the highest HIV prevalence (Cambodia, Myanmar, Thailand and several large states in India); and
- 2 which have large population sizes such as China, India and Indonesia.

## Basic epidemiology of HIV

With the exception of HIV transmission from mother to child and via infected blood/blood products, tissues or organs, all other HIV transmission occurs only as a result of those human behaviour(s) that place an individual at risk of acquiring an HIV infection. The primary risk behaviours that place a person at significant risk of acquiring or transmitting an HIV infection include the sharing of drug injecting equipment and/or having unprotected sexual intercourse with multiple sex partners. Only those persons who are involved in some HIV-risk behaviour(s) or whose sex partner is involved in some HIV-risk behaviour(s) are at any risk of acquiring an HIV infection via sexual intercourse.

*The epidemiological dynamics of HIV infection are different from other infectious disease agents, including other sexually transmitted infections (STI), because the risk of HIV transmission via sexual intercourse is very low compared to most other STI.*

The epidemiological dynamics of HIV infection are different from other infectious disease agents, including other sexually transmitted infections (STI), because the risk of HIV transmission via sexual intercourse is very low compared to most other STI. In the absence of facilitating factors, the transmission of HIV via a single episode of anal or vaginal intercourse is very low. Several epidemiological studies indicate that, in the absence of facilitating factors, the efficiency of vaginal intercourse for HIV transmission is about 1 or less per 1000 sex exposures<sup>1,2</sup>. The risk of HIV transmission via anal intercourse is generally believed to be higher than via vaginal intercourse, but the risk of HIV transmission via anal intercourse is still believed to be low when compared with other STI.

For extensive sexual transmission of HIV to occur, a pattern of concurrent or overlapping sex partners and a high frequency of sex partner exchanges along with a high prevalence of such behaviours must be present. These behavioural parameters can then generate two of the most important facilitating factors: (1) concurrent genital ulcerative lesions from other STI, and (2) a relatively high proportion of new and/or recent HIV infections that are very infectious compared with HIV infections of longer duration. Higher sex partner exchange rates for FSW and a larger proportion of males who visit FSW on a regular basis were found to be important factors in a couple of high HIV prevalence countries in Asia compared with two low HIV prevalence countries in Asia<sup>3</sup>.

Several epidemiological studies have shown that male circumcision is associated with a reduced rate of HIV acquisition<sup>4,5</sup>. However, it is difficult to assess the extent to which these findings may be confounded by fundamental differences between populations with different rates of male circumcision—i.e., differences in social-sexual patterns and prevalence of high-risk sexual behaviours. It is also possible that the relative protective effect of male circumcision may be correlated with the general level of genital hygiene, and lack of or poor genital hygiene in circumcised males may override any relative protective effect of circumcision.

*Annex 1* provides a review of the natural history of HIV infection.

*Annex 2* reviews the present knowledge on mother- to- infant transmission of HIV and the prevention of mother- to- child transmission of HIV in the context of the Asia Pacific Region.

## Major HIV-risk behaviour groups (RBG) in Asia

The patterns and prevalence of the major HIV-risk behaviours in Asia are different from other major geographic regions of the world. In sub-Saharan Africa, the predominant mode (over 95%) of HIV transmission in the sexually active population is via heterosexual intercourse. In “Western” countries, MSM and IDU groups continue to be the most prominent RBG involved in HIV transmission. In Asia, IDU, as well as FSW and their clients, are the most prominent RBG involved in HIV transmission. The following are descriptions of the major HIV RBG in Asia.

### MSM

*A relatively extensive spread of HIV occurred in MSM sex networks in many Asia Pacific countries/cities during the mid-to-late 1980s.*

As in all societies around the world, MSM are believed to comprise about 5-10% of all sexually active males in most Asia Pacific countries. However, MSM in Asia represent a diverse group that cannot be easily identifiable for intervention or for public health surveillance. MSM constitute an ill-defined group in Asian society and include men who both sell and buy sex, as well as those who exclusively practice homosexual behaviour and others who are bisexual. Many of these men are married, and all socioeconomic levels are represented in this group. In some settings, biological males who maintain a transvestite lifestyle or a transgender identity may also be part of the MSM community. They represent one of the highest-risk groups for acquiring or transmitting HIV because undefined proportions of them routinely have multiple and concurrent sex partners. However, the structure and patterns of MSM groups who routinely have multiple sex partners, especially their general and local sex networks within Asia, are widely unknown.

A relatively extensive spread of HIV occurred in MSM sex networks in many Asia Pacific countries/cities during the mid-to-late 1980s.

### IDU

The Asia Pacific region has been significantly affected by drug-related HIV epidemics. The association of IDU and HIV infection in Asia comprises very dynamic and rapidly changing patterns of drug and injecting drug use. New drugs are constantly appearing and new populations are then caught up in injecting drugs. In most countries in south and south-east Asia, IDU have usually been the first HIV RBG detected with extensive HIV transmission. Drug users in Asia Pacific countries are rapidly switching from non-injecting drugs to injecting drugs resulting in many explosive HIV epidemics. Examples include some provinces in southern China, in Delhi and north-east India, and most recently, during the late 1990s, in Nepal, where HIV prevalence has rapidly reached levels of 50% or higher among IDU. Other Asia Pacific countries and locations such as Myanmar, Malaysia, Pakistan, and Viet Nam have also reported extensive HIV transmission in their IDU

populations. Data from Indonesia for the years 1999-2000 indicate that HIV prevalence is rising rapidly among IDU populations throughout the country.

Epidemiological observations over the past 15 years have shown that HIV transmission from HIV-infected IDU (mostly young males) to some of their regular or steady sex partner(s) is occurring. Similarly, infected male clients of FSW can be expected to transmit their infection to some of their wives or girlfriends. However, the average reproductive number (*Annex 3*) of HIV in these groups is generally below 1 and, as a result, further penetration or spread of HIV to the general population has not been documented to any significant degree. HIV epidemics associated with IDU and other HIV RBG are often independent of each other. These epidemics can emerge and evolve separately – with minimum crossover – as exemplified by the two concurrent HIV epidemics of different subtypes in Thailand, one among IDU and the other among high-risk heterosexuals<sup>6</sup>. Nevertheless, the high prevalence of HIV infections in some IDU populations serves as a constant potential source for introduction of HIV to other RBG such as MSM or FSW.

#### **Heterosexuals with multiple sex partners (*Annex 4*)**

HIV is primarily an STI. As with all other STI, the major driving force of the HIV pandemic is heterosexual transmission. This is because heterosexuals constitute the vast majority (about 90% or more) of all national populations, compared with the much smaller numbers of IDU and MSM. Although high rates of HIV infection have been found, and may still occur in susceptible pockets of IDU and MSM, more than 90% of the global total of HIV infections have been, and will continue to be due to heterosexual transmission. HIV prevalence in most countries will generally not exceed 0.5% of the total 15-49 year-old population unless some extensive HIV transmission occurs within the heterosexual population.

Studies of sex networking in south-east Asia have classified heterosexual multi-partner relationships into three types: commercial sex only; noncommercial sex only; and a combination of commercial and noncommercial sex<sup>7</sup>. These studies and other research on sexual behaviour suggest a general pattern for Asia – in contrast to Africa, North America and Europe – of cultural and social norms that restrict the majority of females from premarital and extramarital sex. This view is further supported by behavioural data collected from 16 developing countries in Africa, Asia, and Latin America in 1989-90 through the World Health Organization's Global Programme on AIDS (WHO/GPA). Single women in the Philippines, Singapore, Sri Lanka and Thailand reported rates of sexual intercourse far lower than their African (nine countries) and Brazilian counterparts<sup>8</sup>.

Within the Asia Pacific region, FSW have the highest sex partner exchange rates and therefore represent the most significant core group for heterosexual transmission. The critical factors influencing the rate of spread from FSW include the number of clients per day and the proportion of males who regularly visit sex workers. In Cambodia, Myanmar and Thailand, HIV prevalence among FSW has risen to over 50% in many areas. Similarly, in India, where the sex trade is large, in some cities up to half or more of FSW are infected. Even in Papua New Guinea, where formal brothels and red light districts do not exist, HIV levels among urban floating



*In Asia Pacific countries other than Cambodia, Myanmar, Thailand and parts of India, the prevalence and frequency of heterosexual risk behaviours do not appear to be sufficient to fuel extensive heterosexual HIV transmission.*

sex workers reached 16% in 1998. Sex work continues to be illegal in virtually all Asia Pacific countries and, therefore, it is often hidden and clandestine, which makes prevention interventions difficult.

Low rates of premarital sex among single women, combined with high rates of commercial sex patronage among men – a pattern found in Cambodia and Thailand, for example – create the opportunity for substantial HIV epidemics in the core populations of FSW and their male clients. In Asia Pacific countries other than Cambodia, Myanmar, Thailand and parts of India, the prevalence and frequency of heterosexual risk behaviours do not appear to be sufficient to fuel extensive heterosexual HIV transmission. A probable exception to the prospects of continued low HIV prevalence may be Papua New Guinea, where there appears to be a slow but steady increase in heterosexual transmission of HIV.

### HIV situation in Asia Pacific countries

The HIV situation analysis is based on results from HIV/AIDS case reporting, HIV sentinel surveillance and other sources, such as mandatory testing among blood donors, specific surveys, etc. (*Annex 5, Annex 6*).

Table 1 lists all Asia Pacific countries in rank order by their estimated HIV prevalence rate along with some assessment of the major RBG affected. In general, when extensive spread of HIV is occurring primarily in MSM and/or IDU populations, the total national HIV prevalence level will be in the general range of about 0.5% or less. Only when extensive HIV spread occurs among heterosexuals will national HIV prevalence levels begin to exceed 1%. As of 2001, only three Asian countries have an estimated national prevalence rate greater than 1% in their 15-49 year-old population—Cambodia, Myanmar and Thailand.

### Projected impact of HIV/AIDS in Asia Pacific countries

The clinical burden of HIV infections that can be expected over the next five years in Asia Pacific countries is directly related to their current HIV patterns and prevalence rates and can, therefore, be reliably projected using a scenario/modelling method (*Annex 8*). In Asia Pacific countries that currently have a low HIV prevalence (less than 0.1%), annual AIDS deaths are projected to be less than 1% of all adult deaths throughout the first half of the coming decade. The clinical impact of AIDS and other HIV-related conditions in the seven Asia Pacific countries with moderate HIV prevalence (>0.1% and <1% of the 15-49 year-old population) will increase annual adult deaths by about 5% during this coming decade, with most of these AIDS deaths among young male IDU. For the high HIV prevalence countries (Cambodia, Myanmar, Thailand and a few states in India), annual AIDS deaths will increase the total annual deaths in the 15-49 year-old population by up to 40%.

It is estimated that more than 500 000 individuals died of AIDS in 2000 and that this number will reach about 800 000 by 2005 (Table 2). The highest number of deaths is expected to occur in China, India, Myanmar and Thailand. The burden of AIDS cases on health services will be particularly high in Cambodia, Myanmar,

**TABLE 1. Estimated HIV prevalence and major route(s) of HIV transmission in Asia Pacific countries, 2000**

Country	Population 15-49	Number HIV+	HIV Prev (%)	HET	MSM	IDU <sup>1</sup>	Comments
Cambodia	6 091 000	169 000	2.77	+++	—	—	* Extensive HIV spread among FSW and their male clients, but limited spread from infected clients to their sex partners.
Myanmar	25 768 000	510 000	1.99	+++	—	++	
Thailand*	36 241 000	671 000	1.85	+++	—	++	
India	522 862 000	3 900 000	0.75	++	—	+	* Major diversity among states.
Papua New Guinea	2 450 000	15 000	0.60	++	—	—	* Increasing heterosexual transmission.
Malaysia	11 654 000	42 000	0.36	—	—	++	* Extensive HIV spread among IDU cohorts, but limited spread to other high HI- risk behaviour cohorts.
Nepal	11 259 000	34 000	0.30	+	—	++	
Viet Nam	42 275 000	122 000	0.29	+	—	++	
Singapore	2 027 000	3900	0.19	—	+	—	* Initial MSM importations.
Australia	9 543 000	12 000	0.13	—	++	++	* Primarily MSM and IDU
Pakistan	72 468 000	73 000	0.10	—	—	++	* Diverse patterns and spread among IDU.
Indonesia	116 009 000	100 000	0.09	—	—	++	* Recent IDU epidemics
China	720 355 000	600 000	0.08	—	—	+++	* Primarily focal IDU epidemics
Sri Lanka	10 572 000	8500	0.08	—	—	—	* Initial MSM importation
Fiji	429 000	300	0.07	—	—	—	
Hong Kong, China	3 918 000	2500	0.06	—	+	—	
New Zealand	1 939 000	1200	0.06	—	+	+	* Primarily MSM
Maldives	131 000	<100	0.05	—	—	—	* Low HIV prevalence among all HIV-risk behaviour cohorts. The vast majority of HIV infections are imported with some limited transmission from these imported infected persons to their steady or regular sex partners.
Lao PDR	2 402 000	1300	0.05	—	—	—	
Philippines	38 428 000	10 000	0.03	—	—	—	
Bangladesh	68 021 000	13 000	0.02	—	—	—	* Low HIV prevalence among all HIV-risk behaviour cohorts. The vast majority of HIV infections are imported with some limited transmission from these imported infected persons to their steady or regular sex partners.
Japan	58 098 000	10 000	0.02	—	+	—	
Rep of Korea	22 700 000	3800	0.01	—	—	—	
DPR Korea	13 270 000	<100	<0.01	—	—	—	* Low HIV prevalence among all HIV-risk behaviour cohorts. The vast majority of HIV infections are imported with some limited transmission from these imported infected persons to their steady or regular sex partners.
Mongolia	1 411 000	<100	<0.01	—	—	—	
Bhutan	938 000	<100	<0.01	—	—	—	
Brunei Darussalam	178 000	<100	Low	—	—	—	* Low HIV prevalence among all HIV-risk behaviour cohorts. The vast majority of HIV infections are imported with some limited transmission from these imported infected persons to their steady or regular sex partners.
Other Pacific	1 300 000	1300	<0.01	—	—	—	
Island countries							
<b>Total</b>	<b>1 802 737 000</b>	<b>6 304 300</b>					

Data source – UNAIDS/WHO Global Report (June, 2000, estimated for the year 1999) –with more recent estimated numbers (for the year 2000) for Cambodia, China, India, Indonesia, Malaysia, Papua New Guinea, the Philippines, Sri Lanka, Thailand and Viet Nam, with prevalence rates based on the 15-49 year-old population of 2000 as the denominator - \* estimates in 2001.

( \_\_ ) Unknown or minimal HIV transmission; (+) limited HIV transmission; (++) moderate HIV transmission; and (+++) major HIV transmission

Thailand and certain parts of India. Efforts are urgently needed in the most affected countries to strengthen the capacity of health services to support individuals with AIDS and to reduce the stigmatization and discrimination against families and individuals affected by AIDS.

The estimated number of paediatric AIDS cases and maternal AIDS orphans is directly related to the number of HIV-infected females of child-bearing age and their fertility rates (*Annex 2*). HIV prevalence is low in most Asia Pacific countries and the predominant HIV-risk behaviour populations are IDUs, who are predominantly male, FSW and their male clients. The male-to-female ratio of HIV infections in most Asia Pacific countries is generally many more males than females. These factors (generally low HIV prevalence, a much higher male-

**Table 2:** Estimated and projected annual numbers of AIDS deaths among the 15-49 year-old population in Asia, 2000 and 2005

Country	2000	2005
India	350 000	500 000
Thailand	55 000	>50 000
Myanmar**	46 600	>55 500
China	20 000	80 000
Cambodia	>11 000	>24 000
Bangladesh **	>11 000	17 000
Viet Nam*	4000	>11 000
Pakistan	3500	11 000
Indonesia	3000	18 000
Nepal	3000	6000
Malaysia	2400	>6000
Papua NG	750	2400
Sri Lanka	500	>1000
Philippines	200	750
Japan	650	650
Rep. of Korea	250	350
Lao PDR	<100	>200
Australia*	190	190
Singapore*	140	220
Hong Kong, China***	60	60
New Zealand ***	27	27
Brunei	<5	<5
Macau, China ***	3	3
All Pacific islands ***	10	10
Bhutan****		
Mongolia****		
DPR Korea****		
Maldives****		
<b>Total</b>	<b>&gt;500 000</b>	<b>&gt;784 000</b>

-Aids deaths: based on the estimate of HIV prevalence in 2000 and estimated shape of the annual HIV incidence curve using standard survival of 9 years (Thailand: according to Thai working group on HIV/AIDS projection)

- AIDS cases used in some countries: \*estimated by country level, \*\*estimated by UNAIDS/WHO working group

-No Estimation/projection of AIDS/deaths developed: \*\*\* newly reported AIDS cases per year;

\*\*\*\* very few reported AIDS cases.



*Injecting drug use and high sex partner exchange rates are difficult subjects for government or official agencies to deal with. Urgent and universal support for primary prevention and behaviour change programmes has not yet materialized.*

to-female ratio of HIV infection), plus a low age-specific fertility rate, accounts for the relatively low prevalence of mother-to-child transmission of HIV in the Asia Pacific region. With the possible exception of the few high HIV prevalence countries in south and south-east Asia, current and projected numbers of paediatric AIDS cases and maternal AIDS orphans in most Asia Pacific countries are expected to remain low.

Persons with latent infection with *Mycobacterium tuberculosis* (*Mtb*) and who are also infected with HIV develop clinical tuberculosis at an increased rate. Modelling of the interaction between HIV and *Mtb* infections provides useful estimates and projections of the additional tuberculosis cases that may be expected annually in different epidemiological situations. The prevalence of *Mtb* infection among young and middle-aged adults in Asia Pacific countries is relatively high (ranging from 35% to over 70%). However, HIV prevalence levels in Asia Pacific range from much less than 0.1% in most countries up to 2-3% only in Cambodia, Myanmar, Thailand and parts of India.

In Cambodia, under the worst-case scenario, the annual number of HIV-related tuberculosis cases in the 15-49 year-old population could, by the end of the coming decade, equal the total expected annual number of tuberculosis cases that would occur in the absence of HIV. Most Asia Pacific countries with current low HIV prevalence can expect to have an increase of HIV-related tuberculosis – from 5-10% or less.

### Current and future challenges to HIV/AIDS prevention in Asia

The common thread that runs through all extensive or epidemic transmission of HIV in Asia is that the primary HIV RBG affected are all socially marginalized and engage in socially unacceptable and often illegal behaviour(s). Injecting drug use and high sex partner exchange rates are difficult subjects for government or official agencies to deal with. Urgent and universal support for primary prevention and behaviour change programmes has not yet materialized.

#### Public health interventions

The available interventions for prevention of HIV transmission should be separated into immediate and short-term interventions in contrast to longer-term interventions. Examples of immediate or short-term interventions are those often referred to as “risk-reduction” and “harm-reduction” interventions – routine and consistent condom use with commercial or casual sex partners and provision of safe drug injecting equipment. These interventions are universally accepted and recommended by virtually all HIV/AIDS programmes, but remain controversial because opponents of these measures believe that acceptance of these interventions may condone HIV-risk behaviours and/or will tend to promote such behaviours. The primary example of a longer-term intervention is the reduction, modification or elimination of HIV-risk behaviours – having multiple sex partners, especially on a concurrent basis and/or the recreational use of legal or illegal drugs. These latter interventions are also universally accepted, but, in addition to taking decades or generations to effect meaningful behavioural change, they remain difficult to achieve because the science or art of changing human behaviour (i.e., cigarette smoking, healthy diet and exercise, etc.) is still developing. Ideally, both types of



interventions (immediate and longer-term) should be fully implemented, but, as pointed out above, the immediate risk-reduction and/or harm-reduction interventions remain controversial or illegal.

### Competition for limited HIV/AIDS programme support

The basic objectives of all national AIDS programmes are to prevent HIV infection and provide care to those infected. With unlimited resources, attainment of both objectives might be possible. However, with limited resources, a natural tension and competition for resources exists between prevention/control programmes and treatment/care programmes. In the Asia Pacific region, only a few countries/city states (i.e., Australia, Hong Kong, Japan, the Republic of Korea, New Zealand and Singapore) have adequate resources to support both types of programme. In most other Asia Pacific countries, there are insufficient resources to adequately support prevention programmes and, therefore, the cost of routine anti-HIV drug treatment is out of reach.

*Most policy-makers are hesitant to make the difficult policy decision to maximize government support to primary prevention programmes.*

The dilemma confronting most Asia Pacific countries is whether funds should be divided to provide some support for both types of programme. Most policy-makers are hesitant to make the difficult policy decision to maximize government support to primary prevention programmes. This is especially difficult when the choice may, in some instances, be between providing funds for needle-exchange programmes or for anti-HIV drugs to treat infected children. For most Asia Pacific countries, the tension and competition between HIV prevention and treatment/care programmes will continue and, as a result, risk-reduction and harm-reduction programmes that are required for effective prevention of HIV in the Asia Pacific region may continue to be underfunded.

With only a few exceptions, most national HIV/AIDS programmes in Asia are underfunded. In virtually all of the poorer Asia Pacific countries, many foreign donors have provided support for specific projects, such as outreach programmes for FSW or IDU populations in a few selected districts. The resultant patchwork of HIV/AIDS projects leads to very incomplete national coverage for any of the risk-reduction and/or harm-reduction interventions needed in the highest HIV RBG in the country – IDU and FSW. The future of HIV/AIDS prevention/control programmes in most poor Asia Pacific countries will also depend on how well external donors can increase their current HIV/AIDS support.

### HIV/AIDS in Asia and the Pacific in the new millennium

In the few Asian countries where extensive HIV transmission has occurred during the past decade (Cambodia, Myanmar, Thailand and parts of India), the most recent HIV surveillance data indicate that HIV prevalence peaked in these countries during the mid-to-late 1990s. However, during the coming decade, HIV prevalence in these countries is not expected to decrease rapidly, but will likely persist at around 2-3% because HIV transmission from infected FSW and infected male clients of FSW to their regular sex partners will continue to occur at a steady pace.

In Asia Pacific countries where extensive HIV spread has occurred primarily in IDU populations (China, Indonesia, Malaysia, Nepal, Pakistan, Viet Nam and parts of India), this HIV pattern is projected to continue with little change during this decade. Public health interventions, directed at minimizing HIV transmission among IDU groups, can only be effective if these interventions are fully supported by national governments. However, HIV sentinel surveillance focused on FSW and STI patients in these countries should be sufficient to provide adequate warning should extensive heterosexual HIV transmission begin. In the absence of extensive heterosexual transmission, HIV prevalence rates in the total 15-49 year-old populations of these countries are not expected to increase to much more than about 0.5%.

*HIV/AIDS will, therefore, continue to pose an immense challenge to public health workers throughout the region because all the major HIV-risk behaviours are present in virtually all Asia Pacific countries, albeit in significantly varying patterns and degrees.*

The exact dynamics, quantitative aspects, and mix of epidemiological parameters (patterns and prevalence of sex partner exchange, temporal presence or absence of facilitating factors, etc.), needed to ignite extensive heterosexual transmission of HIV or to determine how high HIV prevalence may reach, are not known with any degree of certainty. In Asian countries where no extensive heterosexual transmission of HIV has occurred, but where pockets of high heterosexual HIV-risk behaviours exist, some extensive HIV transmission may occur when, and if a sufficient number of HIV infections are permitted to accumulate. In addition, in countries where the patterns and prevalence of sexual risk behaviours are increasing, the potential for extensive heterosexual HIV transmission will also increase. HIV/AIDS will, therefore, continue to pose an immense challenge to public health workers throughout the region because all the major HIV-risk behaviours are present in virtually all Asia Pacific countries, albeit in significantly varying patterns and degrees.

Regardless of what the future growth potential of HIV/AIDS may be in the Asia Pacific region, the only responsible public health action to take involves focusing HIV/AIDS interventions on the highest HIV RBGs. From all the HIV/AIDS epidemics that have occurred in Asia Pacific countries, it is clear that sustained heterosexual HIV transmission will only occur in those populations with sufficient heterosexual risk behaviours. In addition, it is also clear that the first evidence of extensive heterosexual transmission of HIV will be found among FSW and STD patients, and current HIV surveillance systems in most Asia Pacific countries are capable of detecting HIV prevalence rates when they reach 1% or more in these RBGs.

To ensure that extensive HIV transmission will not occur, or will not continue to occur in Asia Pacific countries, public health programmes must fully implement the "100% condom programme" for all commercial and casual sex encounters. Such programmes are urgently needed in current high HIV prevalence countries and in present low HIV prevalence countries before HIV prevalence rises to detectable levels. The 100% condom intervention effectively focuses on all commercial and casual sex encounters, and has been estimated to have prevented several million HIV infections in Thailand during the 1990s. However, in current high HIV prevalence countries, there is also an urgent need to address the slow but continuing problem of HIV transmission from infected FSW and/or infected male clients to their regular sex partners, since the 100% condom programme does not target regular sex partners. Similarly, where HIV prevalence is high or still low among IDU populations, public health programmes should aggressively implement, or at least fully support harm-reduction programmes for IDU groups to prevent HIV transmission in this very vulnerable RBG.



The extent to which current national HIV prevalence levels in Asia Pacific countries may increase in the new millennium will depend on how effective national AIDS programmes are implementing risk-reduction and harm-reduction interventions in FSW and IDU populations.

## 2 Country Status



This section of the report provides additional details on the HIV/AIDS situation for each country in the Asia Pacific region. Countries will be presented in a descending order, starting with countries with the highest estimated HIV prevalence rate to those countries with the lowest estimated HIV prevalence rates.

The HIV/AIDS situation in each country will be presented, along with an estimate of the annual number of AIDS deaths that can be expected in the years 2000 and 2005. These estimates of AIDS deaths are based on the estimate of HIV prevalence in the year 2000 and on the estimated shape of the annual HIV incidence curve (Annex 8). In this report, annual AIDS deaths will be calculated based on a standard median survival interval of 9 years.

As described in the first section of this report, only countries where extensive heterosexual transmission of HIV has occurred have an HIV prevalence rate in their 15-49 year-old population of more than 1%. These areas include Cambodia, Myanmar, Thailand and several major states in India. In countries where extensive HIV transmission has occurred primarily only in IDU and/or MSM, estimated national HIV prevalence has generally been more than 0.1%, but less than 1%. These countries include Australia, Nepal, Indonesia, Malaysia, Viet Nam, and Pakistan. All the other Asia Pacific countries where no extensive or only limited HIV transmission has been detected have low HIV prevalence (less than 0.1%).

## Group I – High HIV prevalence countries

### Cambodia

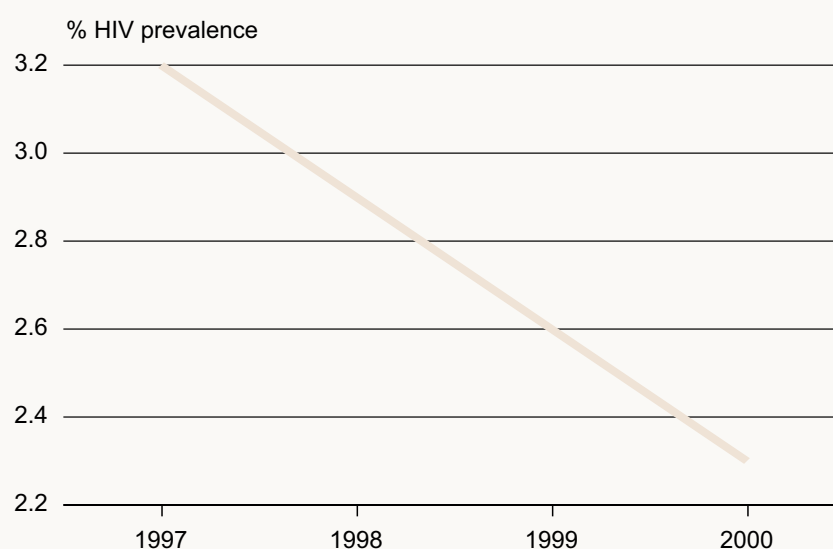
Cambodia is a country with a total estimated population in 2000 of about 12 million, with about 6 million in the 15-49 year-old age group. Cambodia lies in the south-western Indo-Chinese Peninsular in south-east Asia. It is bordered by the Lao People's Democratic Republic, Thailand and Viet Nam, and by the Gulf of Thailand. Cambodia has a developing economy and is one of the world's poorest countries, with a per capita gross national product (GNP) in 1999 of \$280.

#### HIV/AIDS situation

HIV infections were first detected in Cambodia through serological screening of blood donors in the early 1990s. However, the general magnitude of HIV transmission in the country was not fully described until the completion of the first HIV sentinel surveillance (HSS) round in 1995. HIV sentinel groups that year included eight different populations in nine provinces located mainly on the Thai border, where HIV infections were suspected to be high. The results provided the first evidence of a highly disseminated HIV epidemic, with prevalence of HIV up to 38% among FSW, 8% among police and the military, and about 2.5% among women attending antenatal clinics (ANC).

Extrapolating from data collected from continued annual HSS rounds, HIV prevalence in Cambodia was estimated at the end of 1997 to have reached a high of over 200 000 infections in the total 15-49 year-old population. HSS data collected in 2000 indicate that HIV prevalence has decreased in all sentinel groups and

**FIGURE 3:**  
HIV trend among  
antenatal women,  
Cambodia,  
1997-2000



Source: MOH Cambodia

that national HIV prevalence has peaked and may be declining, as it has in Thailand (Figure 3). The estimated national HIV prevalence for the year 2000 is 169 000 (2.8%) and remains the highest estimated prevalence rate in the Asia Pacific region.

#### HIV-risk behaviours

The first HIV Behavioural Surveillance Survey (BSS) in Cambodia was started in 1997. A preliminary behavioural survey on a small scale was conducted one year before. From 1996 to 1999, the consistent condom use rate increased from 15.7% to 78% among sex workers (Figure 4), and from 45 % to 81% among the police. Some studies have reported that about 60% of the Cambodian police force have visited sex workers in the past year. These findings clearly reflect the increasing programme activities on condom promotion in sex work in this country. The BSS also showed that the partner exchange pattern in this country is one of the highest in the Asia Pacific region. The mean number of clients in the previous night was 3.2 per sex worker.

#### Other STI

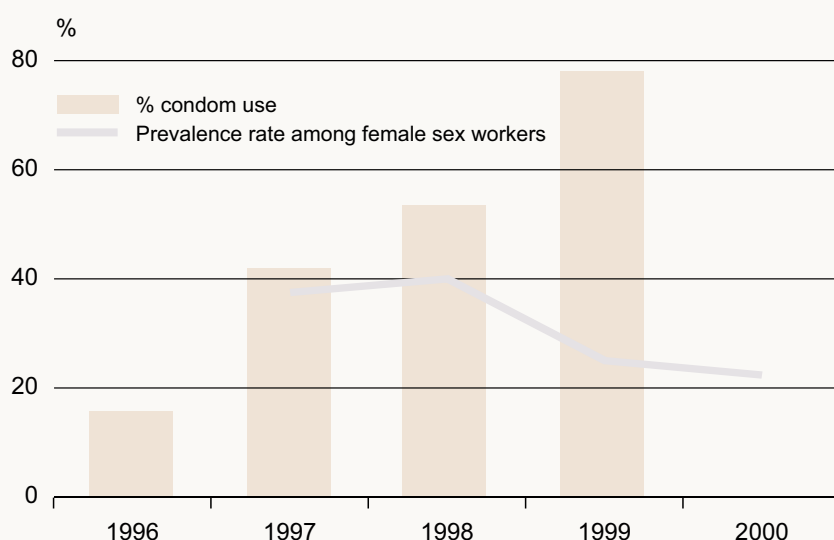
STI prevalence surveys in Cambodia were planned to be undertaken in 1996, 2000 and again in 2003. In 1996, STI prevalence rates were found to be high among sex workers. These rates varied by site and ranged from 4-19% for syphilis (confirmed by TPHA), 17-26% for Chlamydial infection (by LCR) and from 20-34 % for gonorrhoea (by culture).

#### Estimated clinical impact of HIV

Based on an estimated HIV prevalence of 169 000 in the year 2000, the clinical case load of AIDS deaths, as well as HIV-related tuberculosis cases can be estimated and projected with some confidence up to the year 2005.

In the Asia Pacific region, Cambodia, even prior to the introduction of HIV/AIDS, had one of the highest estimated annual mortality rates (from all causes) in the total 15-49 year-old population – about 6-7 per 1000 per year. Thus, even in the absence of AIDS, over 30 000 deaths were expected to occur in this age group in the year 2000. The estimated annual number of AIDS deaths in this age group in Cambodia ranges from

**FIGURE 4:**  
HIV and condom  
use trends among  
female sex  
workers,  
Cambodia,  
1996-2000



Data source: MOH Cambodia



over 11 000 in the year 2000 and gradually increases to more than double (24 000) in the year 2005, an increase in total deaths in this most productive age group of from about 35% to 80%.

The expected numbers of HIV-related tuberculosis cases in the 15-49 year-old population in the year 2000 is 5000-6000 and, by 2005, this number is projected to increase to about 10 000 cases. These numbers represent an increase in the total tuberculosis case-load in this age group of close to 15% in the year 2000, and over 20% in 2005.

Overall, the clinical case burden of HIV-related disease(s) and conditions estimated and projected for Cambodia will be the most severe in the Asian Pacific region. Cambodia will require much additional technical and fiscal support to adequately respond to these severe medical and social problems.



## Myanmar

Myanmar shares borders with Bangladesh, China, India, the Lao People's Democratic Republic and Thailand. Its estimated total population in 2000 was close to 49 million, with about 25 million in the 15-49 year-old age group. Myanmar is one of the least densely populated countries in Asia, and the rugged, forested portion of its terrain is still only lightly settled – it is a land of villages, where fewer than one-fourth of the people live in urban areas. The annual rate of growth of the population is somewhat high by world standards but is about average for south-east Asia. Myanmar has a centrally planned, developing economy that is largely nationalized and is based principally upon agriculture and trade. The GNP per capita, however, remains one of the lowest in the world.

### HIV/AIDS situation

HIV was probably introduced to Myanmar in the mid-to-late 1980s. HIV prevalence among IDU in the capital, Yangon, had reached 73% by 1989. Since then HIV infection rates among IDU tested in Yangon and Mandalay have ranged from over 50% to 85%. HIV prevalence among sex workers tested in Yangon and Mandalay has increased from a median of 4% in 1992 to 26% in 1997. HIV prevalence among ANC tested in Yangon and Mandalay increased from no evidence of infection in 1992 and 1993 to 0.8% in 1995. HIV prevalence among ANC remained about 2% in 1998, 1999 and 2000. Outside the major urban areas, HIV prevalence among some ANC tested in 2000 reached up to 5%. HIV infection among military recruits tested in Yangon and Mandalay increased from 0.5% in 1992 to 1.4% in 2000.

There are two HSS sites – one each in the largest cities in Myanmar (Yangon and Mandalay) - for FSW and military recruits and six (6) sites for IDU. For ANC attendees, there have been a total of 17 HSS sites, and all of these sites are in urban areas. These HSS sites were selected to include populations suspected to be at

**Table 3:** 2000 HIV Sentinel Surveillance Findings in Myanmar and Thailand

Sentinel population	Myanmar	Thailand
IDU	62.7%	47.2%
Direct FSW	38.0%	18.5% (33.2)*
Male STI Patients	7.1%	5.9%
Military Recruits	1.4%	1.4%
ANC	2.15%	1.46%
Highest level reached in 1994		

the highest risk of HIV and thus, should not be considered representative of the population in Myanmar, especially of the rural population which comprises over 70% of the total population.

Rates and general trends of HIV infection in IDU, sex workers, and pregnant women are similar to those found in Thailand. The 2000 HIV sentinel surveillance findings are presented in Table 3.

The general HIV patterns and prevalence in Myanmar are also very similar to those observed in Thailand. However, there are a few major differences in HIV trends in Thailand compared to Myanmar:

- HIV prevalence peaked among direct and indirect FSW in Thailand around the mid-1990s and has been decreasing since then. In Myanmar, HIV prevalence among direct FSW appears to be still increasing, although some stabilization seemed to be noted in 2000.
- HIV prevalence in Thailand among ANC peaked at slightly over 2% in the mid-1990s and has been slowly decreasing to about 1.5% in the year 2000. Up to 2000, there does not appear to be any peaking of HIV prevalence rates among ANC in Myanmar.
- HIV prevalence in military recruits in Thailand also appeared to have peaked in the mid-1990s and HIV prevalence may have peaked in military recruits in Myanmar in 1999.
- All of the available HIV/AIDS data indicate that the peaking of HIV prevalence among FSW in Thailand was a direct result of the "100% condom programme", started by the Thai AIDS Programme for FSW and their male clients during the early 1990s. A 100% condom programme was started on a pilot basis in late 2000 in four townships in Myanmar. It is, however, too early for these pilot programmes to have had any measurable effect on HIV prevalence among FSW in Myanmar.

UNAIDS has made a prevalence estimate for Myanmar using the reported HSS data up through 1999. The UNAIDS estimate considered the reported HSS data to be representative of the total population. The Myanmar MOH believes that the HIV prevalence estimate of UNAIDS is too high. However, in the absence of an official HIV prevalence estimate, this report will use the UNAIDS estimate to calculate the potential clinical impact of HIV in Myanmar.

Based on some limited behavioural surveillance started in 1997, it appears that consistent condom use rates among FSW in Myanmar increased from about 30% in 1997 to about 50% by the year 2000.

#### Estimated clinical impact of HIV

Based on an HIV prevalence estimate of about 500 000 in the year 2000, the annual number of adult AIDS cases in Myanmar was calculated by UNAIDS to be 46 600 in the year 2000 and is projected to reach over 55 000 in 2005.

The annual number of AIDS deaths that can be expected to occur in Myanmar will be considerable. These deaths will constitute a major, if not the major cause of death in young adults in Myanmar during the coming decade.

## Thailand

Thailand is situated in the west of the Indo-Chinese Peninsula of south-east Asia. Thailand shares land borders with Cambodia, the Lao People's Democratic Republic, Malaysia and Myanmar (Burma). In 2000 the population of Thailand was estimated to be about 62 million, with about 36 million in the 15-49 year-old age group. Almost one-fifth of the population lives in urban areas. More than one-third of the population is younger than 15 years.

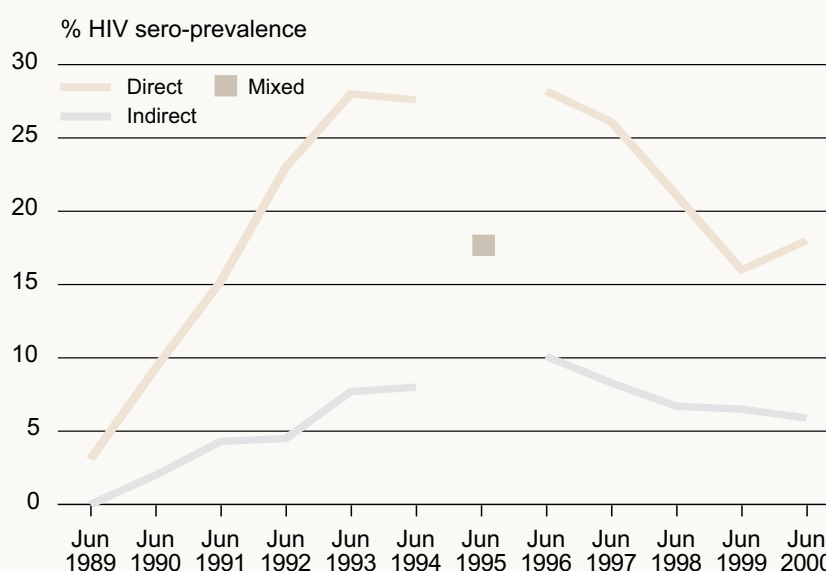
Thailand has a predominantly market economy based largely on services, light industry and agriculture. The GNP is increasing much more rapidly than the population. Thailand continued to have a trade deficit during the 1980s and into the 1990s. Thailand is among the more developed countries in Asia and during the early 1990s became ineligible for some bilateral donor assistance.

### HIV/AIDS situation

Thailand was the first country in Asia to document HIV epidemics among IDU) and FSW and their clients. After a brief period of denial of a significant HIV epidemic, the country organized a national programme, supervised from the highest level of Government, to respond to the HIV epidemics. Thailand has a very comprehensive HSS system that has provided reliable information on HIV trends in selected sentinel populations throughout the country.

The Thai HSS system was started in 14 provinces in 1989 and expanded to all 76 provinces by 1990. The system includes blood donors, ANC, IDU, male STI clinic patients, and FSW, both in brothels (direct) and in massage parlors and other places (indirect).

**FIGURE 5:**  
HIV trend among  
direct and indirect  
sex workers in  
Thailand,  
1989-2000



Source: MOH Thailand



In addition to HSS data, HIV data on IDU in Thailand have been supplemented by separate IDU serosurveys. In Bangkok, in late 1987, 1% of IDU were HIV-positive. By the end of 1988, that rate had increased to 30%. Since 1988, HIV prevalence among IDU tested has remained between 20%-50% both in and outside Bangkok.

HIV surveillance data in Thailand indicates that HIV prevalence peaked in FSW and their clients around the mid-1990s and has been slowly decreasing since then (Figure 5). As of the year 2001, about 1.85% of the total 15-49 year-old population in Thailand are estimated to be infected with HIV.

#### Estimated clinical impact of HIV

The HIV/AIDS situation in Thailand is closely monitored and projected (modelled) for public health and health care planning by a national expert group – the Thai Working Group on HIV/AIDS Projection (2000) and the following summary information was provided in their most recent report.

- 984 000 people (951 000 adults and 33 000 children) have been infected with HIV in Thailand since the start of the epidemic.
- 289 000 of these people have subsequently died of AIDS.
- 695 000 people are currently living with HIV and AIDS in the country.
- 29 000 new infections will occur this year of which 4200 will be in children
- 55 000 Thais will develop serious AIDS-related illnesses this year requiring medical care and approximately the same number will die of AIDS complications.

These estimates indicate:

- Approximately 2% of Thai men and 1% of Thai women are living with HIV.
- Infection levels in the adult male population will remain above 1.5% until the end of 2006.
- Each year, up until the end of 2006, over 50 000 Thais will die from AIDS-related causes.
- Over 90% of these AIDS-related deaths will occur in people aged 20-44, the most productive sector of the workforce.
- Unless prevention efforts are sustained at a high level, the epidemic could quickly regain momentum and start to increase rapidly.

#### HIV/AIDS prevention in Thailand

Although Thailand has had substantial success in HIV prevention efforts, close to 30 000 new infections continue to occur each year, according to Thai authorities. At present almost three-quarters of a million people

in the Kingdom are living with HIV or AIDS, creating serious demands for care and social support.

Since it was recognized from the beginning of the HIV epidemics in Thailand that most HIV transmissions were occurring through commercial sex, major efforts were focused on reducing the number of males visiting FSW and promoting condom use in all commercial and casual sexual interactions. These efforts substantially changed the levels of risk behaviour in the country:

- The percentage of adult men visiting FSW annually has fallen from almost 25% of the population to roughly 10%, and
- Condom use when visiting sex workers has become the norm.

The Thai expert group has estimated that these behaviour changes have prevented millions of HIV infections in Thailand during the past decade.

However, as with most other countries in Asia and throughout the world, Thailand has not had much success in reducing HIV prevalence in their IDU population. HIV prevalence among Thai IDUs ranged from 30%-40% during most of the 1990s and, as of the year 2000, HIV prevalence among IDUs had increased to about 50%.

The noted "success" of Thailand with their 100% condom programme for all commercial and casual sex has not had much effect on the slow but steady transmission of HIV from infected male clients of FSW and from infected male IDU to their regular sex partners (wives and girlfriends). In addition, Thailand's HIV/AIDS prevention interventions have suffered because of the economic crisis in Asia during the late 1990s. The Thai Ministry of Public Health budget for HIV decreased following the crisis in 1997 and many of the international donors (AUSAID, USAID) who left Thailand during the economic boom years have not returned. Thus, overall there are currently fewer resources for HIV/AIDS prevention and treatment in Thailand than previously.

## Group II – Moderate HIV prevalence countries

### India

India is one of the largest countries in southern Asia – geographically it is the seventh largest and second most populous nation in the world. Its estimated total population in 2000 was close to one billion, with over half a billion in the 15-49 year-old age group. India shares land borders with Bangladesh, Bhutan, China, Myanmar, Nepal and Pakistan. The shift of population from rural to urban areas is slower in India than in most developing countries, but one-fourth of the total population is now urban.

India has a developing mixed economy in which both the public and private sectors participate. India's economic growth, though fairly steady since independence in 1947, has been slow, and its gross national product (GNP) per capita remains among the lowest in the world.

#### HIV/AIDS situation

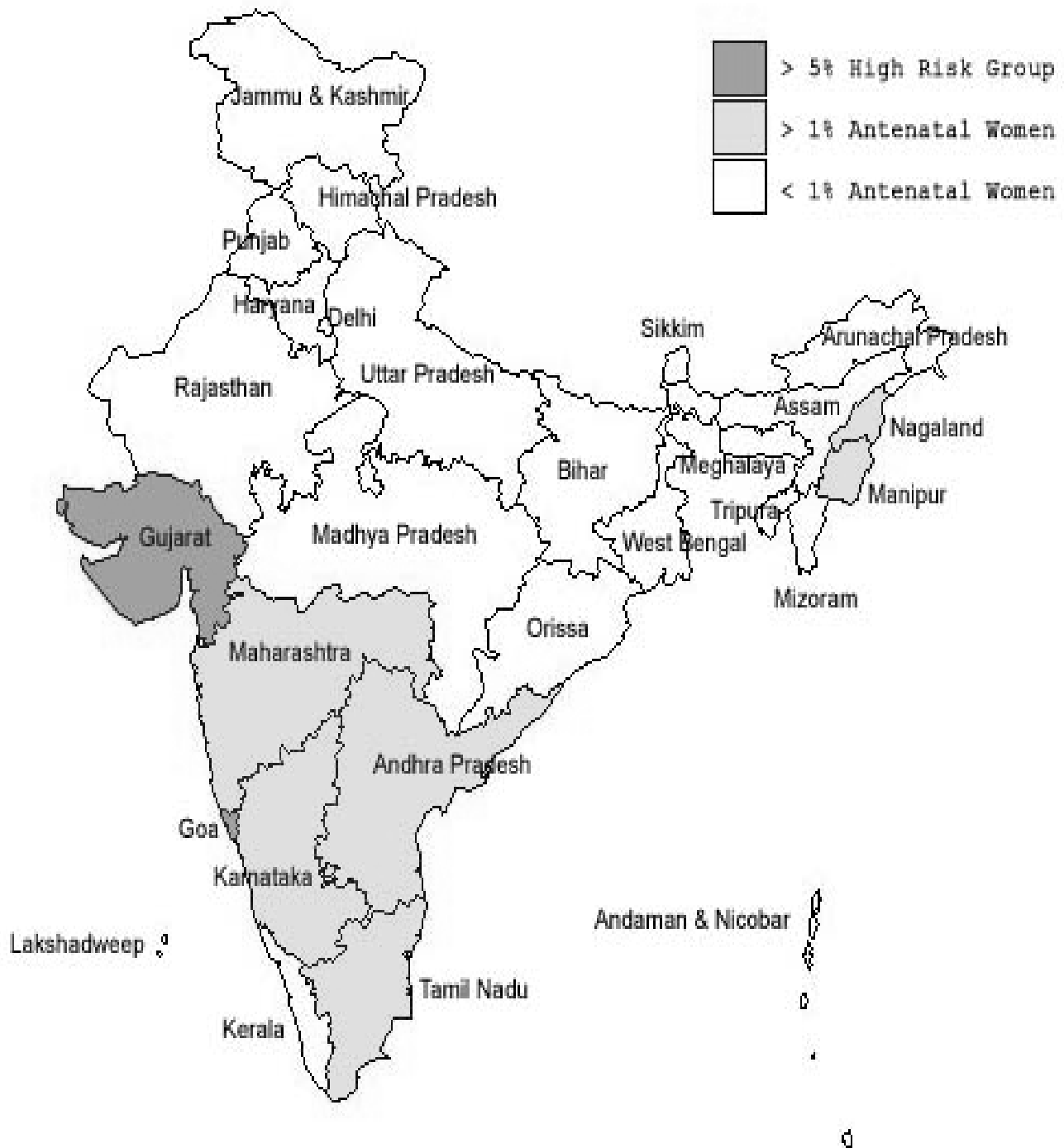
HIV infections were likely imported into India in the early to mid-1980s. The first case of AIDS in India was detected in 1986. Since then, HIV infections have been reported in all States and Union Territories.

With a population of one billion (about half in the 15-49 year-old population), HIV epidemics in India will have a major impact on the overall spread of HIV in Asia and the Pacific as well as globally. The spread of HIV within India is – at least – as diverse as the societal patterns between its different regions, States and metropolitan areas. As a result, tracking HIV patterns, prevalence and trends, and implementing effective programmes, poses a serious challenge to public health programmes. Although HIV prevalence is low in a majority of States, the numbers of HIV infections overall are high. The epidemics vary from States with heterosexually transmitted infections predominating, in Maharashtra and Tamil Nadu, to infections concentrated among injecting drug users (IDU) and their partners in Manipur.

The distribution of HIV/AIDS in India is very heterogeneous. HIV epidemics are focused very sharply in a few southern States, with most of India having extremely low rates of infection. It is noteworthy that 21 of the 31 States only report 4% of the total reported national AIDS cases. The major impact of HIV/AIDS is being felt in Maharashtra in the west, Tamil Nadu in the south with adjacent Pondichery, and Manipur in the north-east. All of these findings highlight the fallacy of considering average national HIV/AIDS figures in India for measuring the HIV/AIDS epidemics. India clearly has areas very severely affected by HIV/AIDS, and yet, as of 2001, major portions of the country still have a very low HIV prevalence. Unless this differential is taken into account for planning interventions, efforts are likely to be inadequate in some areas, and inappropriate in others. With a high prevalence of tuberculosis infection in India, the problem of tuberculosis related to HIV infection also poses a major public health challenge.

Between 1994 and 1997, HIV prevalence among STI clinic attendees in Maharashtra state increased from 6% to 36%, and prevalence among IDU in Manipur increased from 25% to 61%. However, there were insufficient numbers of sentinel surveillance sites to get an adequate picture of the overall HIV situation. There was non-participation of some states, inadequate representation of various risk groups, no representation of

## Adult HIV Prevalence: 2000





the rural population, and a scattered schedule of rounds of collection. In order to obtain better HIV prevalence for India, the National AIDS Control Organization (NACO) instituted a National HIV Sentinel Surveillance (HSS) programme. States were given guidelines on the selection HSS sites to adequately represent the various population subgroups and a regularly scheduled timing for surveillance was instituted.

The 1998 HSS data from antenatal clinics in seven metropolitan cities in the country showed HIV prevalence to be over 2% in Mumbai, more than 1% in Hyderabad and Bangalore, and below 1% in Calcutta, Ahmedabad and Delhi. HIV prevalence levels outside these major urban agglomerations are lower in general, and no infection was found in a number of rural HSS sites.

Based on the analysis of existing sentinel surveillance data, the States and Union Territories can be broadly classified into three groups.

Group I – High HIV prevalence States: includes five States – Maharashtra, Tamil Nadu, Karnataka, Andhra Pradesh and Manipur, where HIV prevalence rates were 1% or greater in antenatal women.

Group II – Moderate HIV prevalence States: includes five States – Gujarat, Goa, Kerala, West Bengal and Nagaland, where HIV prevalence rates were 5% or more among high HIV-risk behavior groups but below 1% in antenatal women.

Group III – Low HIV prevalence States: includes the remaining States, where HIV prevalence rates in any of the high HIV-risk behavior groups were still less than 5%.

#### Estimation of national HIV prevalence

In late 1998, NACO convened a group of national and international experts to review the results of the first round of the expanded HSS with the goal of producing state-specific and national estimates on HIV/AIDS. The new calculations provide greater consistency in making a national estimate of HIV prevalence in India, and the working estimate derived from this consensus meeting – 3.5 million people living with HIV and AIDS in mid-1998 is well within the range of previous estimates. A similar estimation process was held in early 2001 and the national prevalence estimate was increased for 2000 to 3.9 million.

#### Behavioural surveillance

Realizing the need for behavioural data, behavioural surveillance has figured as an important activity in the AIDS II Project. A protocol on behavioural surveillance has been finalized after intensive consultation with sociologists and behavioural scientists. The protocol has been provided to States and Union Territories for initiating this activity.



#### Estimated clinical impact of HIV

Based on the HIV prevalence estimate of 3.9 million in 2000 in the 15-49 year-old population, and on the estimated age and general shape of the annual HIV incidence curve, the annual numbers of AIDS cases and deaths can be calculated. For 2000, a total of close to 350 000 AIDS deaths in the 15-49 year-old population is estimated, and the numbers projected for 2005 are close to 500 000. It needs to be fully appreciated that these numbers are national totals and these estimated deaths will be distributed according to the current HIV prevalence that is present in the different States.

The vast majority of these estimated and projected AIDS cases/deaths will be concentrated in the current high HIV prevalence States of Maharashtra, Tamil Nadu, Karnataka, Andhra Pradesh and Manipur. There will be few AIDS cases and deaths in the current low HIV prevalence States in the central and northern portions of India. Similarly, the distribution of paediatric AIDS cases and maternal AIDS orphans and HIV-related tuberculosis cases will also be occurring mostly in the five southern States with the highest current HIV prevalence rates.

## Papua New Guinea

Papua New Guinea is an island country in the south west Pacific Ocean, encompassing the eastern half of the island of New Guinea and a chain of tropical islands. The country is bounded on the west by Indonesia's half of the island (Irian Jaya), on the north by the Pacific Ocean, on the east by the Pacific and the Solomon Sea, and on the south by the Coral Sea and Torres Strait, which separates the island from Australia. Its estimated population in 2000 was 4.8 million, with 2.4 million in the 15-49 year-old age group.

Papua New Guinea's ethnic composition is extremely complex. There are more than 700 ethnic entities, which can be divided into two large groups: Papuan, comprising more than four-fifths of the total population; and Melanesian, less than one-sixth. The rest are Polynesian, Chinese and European. Ethnic Papuans live in the interior and southern sections, and Melanesian peoples live in the north and east and in the outlying islands. Papua New Guinea possesses a developing mixed economy based to a large extent on the export of mineral and agricultural products. The GNP is growing almost as rapidly as the population. Most of the population exists primarily in a subsistence, non-monetarized but largely self-sufficient economy

**HIV/AIDS situation** The first HIV infections in Papua New Guinea were reported in 1987, with HIV prevalence increasing annually throughout the early 1990s. Reported cases are equally distributed among men and women, and infection appears to be concentrated in the capital city of Port Moresby. Prevalence remains low among blood donors (0.015% in 1997) and pregnant women (0.37% in 1998). The trend in the annually reported number of AIDS cases has continued to rise more sharply each year since the mid-1990s. Much higher levels of infection were found in FSW (17% in Port Moresby and 3% in Lae in 1998) and among patients attending STI clinics (7% in 1999, increasing from 3% in 1998 in Port Moresby, and from 0.7% to 1.2% in 4 other locations in 1997-1999). The estimated HIV prevalence in Papua New Guinea is, as of 2000, about 15 000, or 0.6 % of the total 15-49 year-old population, and continues to increase slowly due primarily to heterosexual transmission.

**Risk behaviors** A wide range of social, economic and cultural factors in Papua New Guinea have led to an environment in which sexual risk behaviors, including low levels of condom use in casual partnerships, are widespread. There have been a few behavioral surveys carried out recently. Among sex workers, the proportion reporting consistent use of condoms was around 15% in Port Moresby and Lae in 1999. The mean number of clients per sex worker was from 3-5 per week. Sexual behaviour surveys among sex workers indicate a predominant practice of vaginal intercourse, but 30% also report anal sex. A similar proportion reports forced sex and group sex.

**STI data** STI prevalence surveys in Papua New Guinea show a high STI prevalence among both high-risk and low-risk groups. A 15 % prevalence of gonorrhoea among Highland's populations and 36% among sex workers were found. Chlamydia prevalence was up to 26% in Highland's populations, and 31% in sex workers. Prevalence of syphilis was 4% in Highland's populations and 32% in sex workers. Trichomoniasis was found in 45-50% of both the low-risk and high-risk populations.

Estimated clinical  
impact of HIV

Based on an estimated HIV prevalence of about 13 800 in 1999, it was projected that there would be about 15 000 HIV infections and close to 2000 cumulative AIDS deaths in 2000. The annual number of AIDS cases deaths was projected to be about 750 in 2000 and close to 2400 in 2005.

## Malaysia

Malaysia is unique in that it is the only country that has territory on both the mainland and insular regions of south-east Asia. It is composed of two noncontiguous regions – Peninsular, or West Malaysia, and East Malaysia. Peninsular Malaysia is bordered on the north by Thailand and on the south by Singapore. In 2000, the total estimated population was close to 23 million, with about 12 million in the 15-49 year-old age group. Ethnic Malays constitute about two-thirds of Malaysia's inhabitants. Chinese who migrated from south-eastern China make up about three-tenths of the population, and Indians, Pakistanis and Tamils (from Sri Lanka) account for most of the remainder. The population of East Malaysia is even more diverse than that of Peninsular Malaysia. The main groups are Chinese (about one-third of the population) and some 25 ethnic groups, as well as smaller tribal subgroups.

Peninsular Malaysia has about four-fifths of the country's population. Approximately two-fifths of the population is urban and the trend of migration is toward the cities. Malaysia has a predominantly market economy that has been transformed from one heavily dependent on the production and export of raw materials to one that is much more diversified. The New Economic Policy and its successors were designed to reduce poverty among Malays and other indigenous people. The GNP per capita is, after Singapore and Brunei, the third highest in south-east Asia.

### HIV/AIDS situation

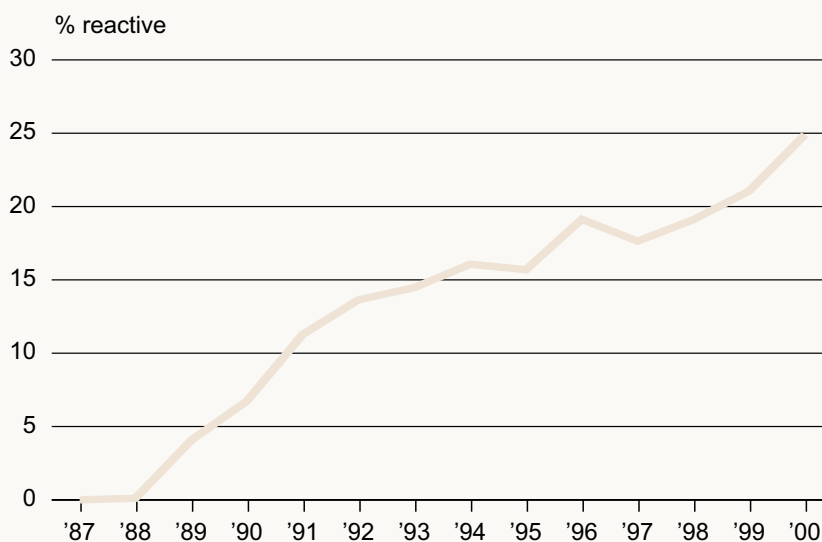
The first AIDS case in Malaysia was reported in December 1986. Since then, the number of HIV infections reported to the Ministry of Health has continued to rise. Data on HIV/AIDS have been collected through various surveillance activities such as routine surveillance, HIV sentinel surveillance (HSS), and special or ad hoc studies.

HIV screening activities throughout the country were started in 1986 among blood donors, injecting drug users (IDU), prisoners, delinquent girls in the rehabilitation centers, sex workers, and those suspected to be exposed to HIV. The Malaysian HSS system was established in 1994 among women attending antenatal clinics (ANC), STI patients and patients with tuberculosis. Beginning in 1998, as tuberculosis patients and ANC attendees were included in routine HIV screening, these target sentinel groups were removed from the HSS system.

The majority of reported AIDS cases (59.6%) and HIV-infections (76.1%) contracted their infection through injecting drug use. A study among HIV-positive IDUs showed that all of them shared needles. Transmission through sexual intercourse accounted for 25.0% of the AIDS cases and 11.7% of HIV infections.

Malaysia is a country with HIV epidemics primarily among its IDU population. HIV prevalence is still very low in the ANC population (0.03 % in 2000, with about 285 000 women tested) and in the blood donor population (0.024 % in 1999, with over 330 000 donors tested). HIV prevalence rates in pockets of FSW and STI patients in major cities are beginning to exceed 5%, but overall throughout the country, HIV prevalence rates

**FIGURE 6:**  
Percentages of IDUs  
reactive for HIV by  
year, Malaysia,  
1987-2000



**Number of samples:**

1987: 1057	1991: 8657	1995: 12 645	1999:18 895
1988: 916	1992: 15 099	1996: 26 595	2000: 19 500
1989: 1750	1993: 18 226	1997: 18 288	
1990: 7901	1994: 23 544	1998: 27 150	

Source: MOH Malaysia

in these risk behavior groups are still probably less than 5%.

HIV prevalence among IDU groups appears to be still rising as shown in Figure 6.

A 2001 consensus workshop on HIV/AIDS estimated a total HIV prevalence of 42 000 in 2000.

Estimated clinical  
impact of HIV

Based on an estimated HIV prevalence of about 42 000 in the year 2000, the annual number of AIDS deaths that can be expected in the year is close to 2400, and it is projected that the annual number of AIDS deaths will be over 6000 in 2005. The vast majority of these deaths will be in young (25-39 year-old) males.



## Nepal

Nepal is a landlocked country in southern Asia, bordered on the north by Chinese Tibet and the Himalayas and by India to the east, south and west. As a result of its years of geographical and self-imposed isolation, Nepal is one of the least-developed nations of the world. The population of Nepal in 2000 was estimated to be close to 24 million, with about 11 million in the 15-49 year-old age group.

The urban population in Nepal is mostly concentrated in the Kathmandu valley. The Government is trying to reduce the high population density in the Tarai region with improved transportation and communication networks, area development projects, and the installation of small industries in rural areas to encourage the growth of smaller urban centres. Nepal has a market economy largely based on agriculture; external donors have heavily subsidized economic development. The gross national product (GNP) per capita is one of the lowest in the world.

### HIV/AIDS situation

As with virtually all other countries in Asia, the first cases of AIDS or HIV infection, were detected during the late 1980s and early 1990s either in a foreign visitor or in a citizen who returned from international travel. During the early 1990s, HIV seroprevalence surveys detected HIV infections among STI patients and FSW throughout most regions in Nepal. As a result, there is great public health concern that extensive spread of HIV, similar to that documented in several neighboring countries (Cambodia, Myanmar, Thailand and parts of India) might occur. IDU in Nepal were initially believed to share injection equipment in relatively small and isolated networks. However, since the mid-1990s, an explosive increase in HIV infection (infecting about half of all IDU throughout the country) has occurred.

Nepal also has a unique situation with regard to the number and mobility of FSW and young males who work in India. Large numbers of young Nepalese girls are recruited as FSW to Indian cities, and large numbers of young Nepalese males working in India frequent FSW there and within Nepal. Thus, in addition to the increasing number of HIV infections occurring among persons with high HIV-risk behaviors in Nepal, there are also increasing numbers of Nepalese FSW and young male Nepalese workers who have been infected with HIV in India, and who have or will be returning to Nepal.

The estimated HIV prevalence in Nepal in 2000 was over 30 000 or close to 0.3% of the total 15-49 year-old population. Asian countries with the highest HIV prevalence (from 2-3% of their 15-49 year-old populations) in the region all have brothel-based FSW as a dominant factor. Because Nepal's pattern of FSW is primarily non-brothel based, it appears likely that HIV prevalence in Nepal may not reach such high levels. Effective public health programmes that can increase consistent condom usage levels in FSW and their male clients to 80-90% may be capable of keeping HIV prevalence in Nepal to less than 1% (i.e., less than 100 000) of the 15-49 year-old population.

#### Estimated clinical impact of HIV

Based on an estimated HIV prevalence of about 34 000 in 2000, the number of AIDS deaths that can be expected in the year 2000 is close to 3000 and this figure is projected to more than double (about 6000) in 2005. It is estimated that these AIDS deaths will increase total deaths in the 15-49 year-old age group by about 5% in 2000 and account for close to 20% of total deaths in this age group in 2005.

## Viet Nam

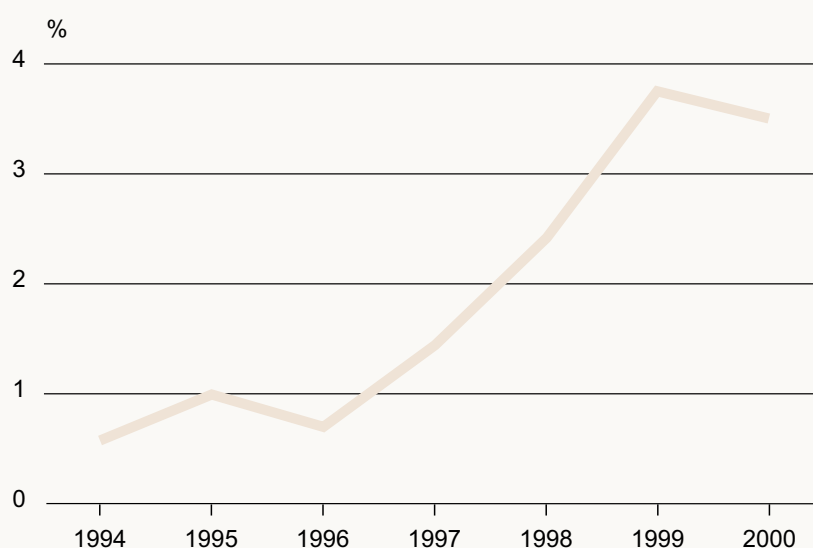
Viet Nam, in south-east Asia, has an estimated 2000 total population of 78.7 million, with 42 million in the 15-49 year-old age group. The country shares land boundaries in the north with China and in the west with the Lao People's Democratic Republic and Cambodia.

Viet Nam has a centrally planned, developing economy that is largely based on agriculture. In 1986, Viet Nam began to move toward an economy that utilized market forces and incentives and tolerated private enterprise. Viet Nam's GNP per capita remains one of the lowest in the world.

### HIV/AIDS situation

HIV/AIDS infection has been reported in all 61 provinces/cities throughout the country. From sentinel surveillance data collected over the past few years, it is possible to describe at least three somewhat separate HIV epidemics in Viet Nam. The most advanced HIV epidemic started among older male IDU in cities of south and central Viet Nam. HIV prevalence among these men varies from 5% to over 50%. A new group of younger men in the southern provinces, who are starting to inject heroin after beginning use by smoking or snorting it, are starting to blend in with this older epidemic. There are also some women in the south who are beginning to inject heroin and who are FSW. A second and more recent HIV epidemic is among young male IDU who live along the main heroin trafficking routes and in cities in the far north of the country and in the Red River Delta. As of 31 May 2001, IDUs accounted for about 61% of cumulative numbers of reported HIV infections. The third HIV epidemic is developing among women who are FSW (Figure 7) in the southern provinces, especially in the Mekong Delta area and in the border

**FIGURE 7:**  
HIV sereoprevalence  
among female sex  
workers, Viet Nam,  
1998-2000



Source: MOH, Viet Nam



provinces with Cambodia. These FSW have acquired their infection in Cambodia and/or in Viet Nam close to the Cambodian border. Sentinel surveillance data have shown an overall increasing trend of HIV infection in sentinel groups.

An expert national committee estimated HIV prevalence in the year 2000 to be about 122 000 (ranging from 107 000 to 137 000) for a prevalence rate of 0.29% in the 15-49 year-old population.

Risk behaviours

The first BSS started in five provinces in July 2000. The frequency of needle sharing (in the previous six months) among injecting drug users has been found to be highest (about 42%) in Ho Chi Minh City, an area with high HIV prevalence among IDUs. About 30-56% of IDU report using condoms consistently with FSW during the previous 12 months. Among FSW, the frequency of sexual contacts is around 60 times/month/SW. Consistent use of condoms is lowest in Ho Chi Minh City (about 31% for Karaoke-based FSW and 55% for street-based FSW). FSW in Hanoi has reported the highest rate (13%) of injecting drug during the last 12 months.

Estimated clinical  
impact of HIV

Based on an HIV prevalence of about 122 000 in 2000, and using different assumptions for the annual HIV incidence curves for the IDU epidemic and the heterosexual epidemic, the annual number of AIDS cases was estimated and projected using Epimodel. Close to 4000 AIDS deaths are estimated in 2000 and the annual total of AIDS deaths projected for 2005 is over 11 000.



## Singapore

Singapore is an island city-state situated at the southern tip of the Malay Peninsula. A road and rail causeway across the Johor Strait to the north connects it with Peninsular (West) Malaysia; the Strait of Malacca to the south-west separates Singapore from the Indonesian Island of Sumatra. The estimated population in 2000 was about 4 million, with about 2 million in the 15-49 year-old age group.

The population consists predominantly of Chinese (three-fourths of the total); with Malays and Indians comprising most of the remainder. The growth rate of Singapore's population declined by more than half between the 1960s and 1980 following the introduction of birth control measures. As a result, less than one-fourth of the population is under 15 years of age. Singapore's population is virtually all urban. Singapore has a predominantly market economy based largely on international trade and finance. The GNP per capita, which is growing much more rapidly than the population, is the highest in south-east Asia.

### HIV/AIDS situation

The first HIV infection was reported in Singapore in 1985. Since then, annual reported numbers of HIV/AIDS have increased steadily. Up until the early 1990s, MSM (including bisexuals) comprised the majority of reported cases of HIV/AIDS. Since then, heterosexually acquired HIV infections and AIDS cases have been steadily predominating. The majority of the cumulative reported AIDS cases have been among men (88%) and heterosexuals (75%). MSM (including bisexuals) have accounted for about 22% and IDU about 2%.

HIV seroprevalence surveys have been conducted since 1989 among STI patients, antenatal clinic attendees, tuberculosis patients and blood donors. Results have shown that Singapore has a low HIV prevalence. In 2000, HIV prevalence rates were about 1% among STI patients and 0.002% among blood donors. An overall HIV prevalence of about 3500 was estimated in 2000.

Based on data from screening of sex workers attending public STI clinics (1996), a low prevalence of chlamydia (0.8%) and gonorrhoeae (0.2%) was found in this high-risk population as result of intensive education and prevention programmes.

### Estimated clinical impact of HIV

The number of new AIDS cases estimated for the year 2001 is about 140 and the projected number for 2005 is about 220. However, these estimates and projections may be much lower since anti-HIV treatment provided in Singapore will delay and/or prevent the development of AIDS in many of its HIV-infected residents.

## Australia

Australia covers a land area of 7 692 000 square kilometres and lies between the Pacific and Indian oceans. The population increased from about four million in 1900 to nearly 19 million by 2000, with about 9.5 million in the 15-49 year-old age group. Migration has been a key factor in population growth. The population is culturally diverse. Almost one in four Australians were born overseas, more than half of these in a non-English speaking country, while 40% were either born overseas or had a parent born overseas. People of Aboriginal and Torres Strait Island descent (although they have increased numerically in the last few decades) number less than 2% of the Australian population (Australian Bureau of Statistics 1999).

Australia's population enjoys good health relative to other countries, with increasing life expectancy and a low incidence of life-threatening infectious disease. Australia's indigenous people, however, experience much poorer health across a range of health indicators than the rest of the population.

Australia is a prosperous country with a capitalist mixed economy. Per capita GDP is higher than in European Union member states (controlling for purchasing power parity).

### HIV/AIDS situation

The epidemiological pattern of HIV in Australia has been and continues to be very similar to that of countries in North America and Western Europe. Extensive HIV transmission occurred within MSM populations in Australia during the early 1980s, with a peak annual incidence of close to 3000 shortly before the mid-1980s. Since that peak, the annual number of HIV diagnoses has continued to decline substantially over time, but the decline appears to have slowed in recent years to around 680 in 1999. The spread of HIV among IDUs in Australia has been and remains limited (less than 0.5% in both men and women seen at metropolitan sexual health centres from 1994 to 1999 who identified as IDU), due to effective prevention programmes. Heterosexual transmission of HIV also remains at low levels (HIV incidence in women having heterosexual contact was estimated by back-projection to have increased during the late 1980s to a peak of around 80 new infections in 1990, followed by a decline).

Transmission of HIV in Australia continues to be overwhelmingly through sexual contact between men. Over 85% of HIV transmissions in Australia are estimated to have been via this route. The number of diagnoses of newly acquired HIV infection among homosexually active men has remained stable at around 130-180 infections per year since 1993.

### Estimated clinical impact of HIV

At the end of 1999, the cumulative number of HIV infections that had occurred in Australia was estimated to be 18 000, with an estimated 12 000 living with HIV infection.

The annual number of AIDS cases in Australia appears to have peaked in 1994, with an estimated 950 cases, and is estimated to have declined to about 196 cases in 1999. The decline in AIDS diagnoses since 1996 has been much more rapid than originally predicted in the mid 1990s. It is now clear, since around 1996, that the



additional decrease in the number of AIDS diagnoses is due to the use of effective combination anti-retroviral therapy for the treatment of HIV infection. There have been similar findings in Canada, the United States and in a number of European countries.

Assuming that the overall benefit of antiretroviral treatment in slowing progression to AIDS remains at the 1999 level, AIDS incidence is predicted to remain steady at around 190 cases per year until 2003. It is currently estimated that around 50% of all people living with HIV infection in Australia are receiving antiretroviral treatment. If this proportion were to increase substantially, then AIDS incidence would be expected to decline. However, the long-term effect of anti-retroviral treatment is unknown and, if treatments fail for a substantial proportion of people, then AIDS incidence could increase again.

## Pakistan \*

Pakistan is Asia's seventh largest country, occupying the north-western portion of the Indian subcontinent. It is bounded to the west by Iran, to the north by Afghanistan, to the north-east by China, to the east and south-east by India, and to the south by the Arabian Sea. Almost all of the population is Muslim; Hindus and Christians make up small minority groups. The estimated population in 2000 was about 151 million, with 72 million in the 15-49 year-old age group. Pakistan has a developing mixed economy based largely on agriculture, light industry and services. The GNP is increasing more rapidly than the population, but per capita is still among the lowest in Asia.

### HIV/AIDS situation

Pakistan, as of 2000, had an estimated HIV prevalence level that can be considered moderate. The vast majority of all detected HIV infections in Pakistan have been found in IDU groups. Low rates (generally less than 1%) of HIV infection have been found in FSW tested as part of the HIV surveillance system. There are no data to indicate that aside from IDU transmission, there is any other significant transmission of HIV occurring in Pakistan at the present time.

UNAIDS/WHO estimated HIV prevalence in Pakistan in 1999 to be about 73 000.

### Estimated clinical impact of HIV

Based on an estimated HIV prevalence in 1999 of 73 000, annual AIDS deaths in Pakistan are estimated at around 3500 for 2000 and around 11000 for 2005.

## Group III – Low HIV prevalence countries

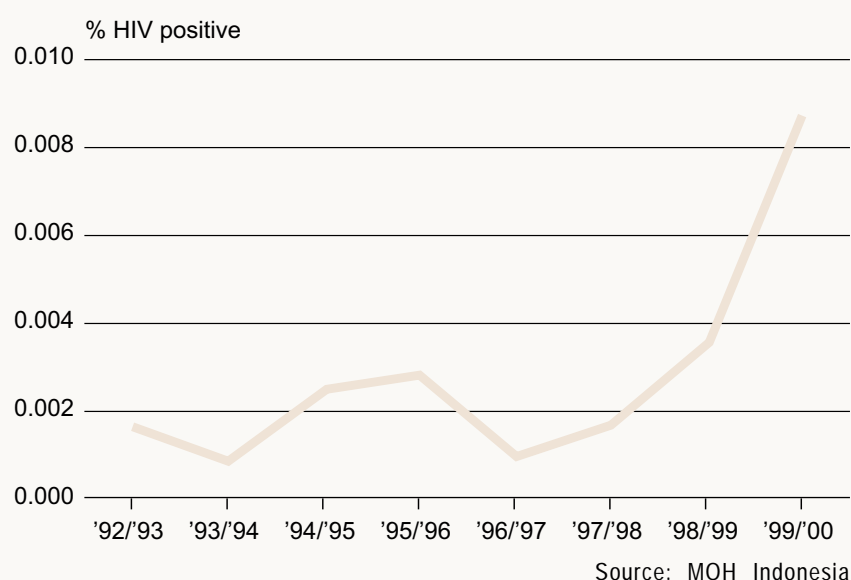
### Indonesia

Indonesia is an island republic lying off the coast of mainland south-east Asia and comprises some 13 670 islands. It is the fourth most populous country in the world, with an estimated total population of about 212, about 116 million of them in the 15-49 year-old age group in 2000. More than four-fifths of the population are Muslim. The densely settled island of Java alone accounts for more than half of Indonesia's population. Madura, Bali and parts of Sumatra and Celebes also have high population densities.

Indonesia has a developing, mixed economy that is based largely on agriculture and manufacturing. The GNP is growing more rapidly than the population; the GNP per capita, however, is low. A marked economic recession that started after 1997 has resulted in a devaluation of the country's currency to about one quarter of its former value against the US dollar.

**HIV/AIDS situation** Until the end of 1998, all HIV/AIDS data collected in Indonesia from all sources indicated that HIV seroprevalence rates were very low (below 0.1%), even in the highest heterosexual risk groups such as FSW. The exception to these very low HIV prevalence was in Merauke (in West Irian) where relatively high HIV prevalence rates were reported among FSW several years ago.

**FIGURE 8:**  
HIV prevalence in blood  
donors, Indonesia,  
1992-2000



Starting in 1999 and continuing in 2000, several HSS sites for FSW began to detect increasing numbers of HIV infections, and prevalence rates of from 1-5% were found in several areas. Although IDU populations were not included as a routine HSS group, several ad hoc serosurveys throughout Indonesia, especially in Jakarta, detected sharply increasing HIV prevalence (up to over 35% in Jakarta) among IDUs in late 2000. This increasing trend of HIV prevalence can be seen in the blood donor data from the Indonesian Red Cross from 1992 to 2000 in Figure 8. In recent years, approximately 750 000 to close to 1 million blood donors have been screened annually for HIV. A marked increase was seen in 1999/2000, probably reflecting the large increase among IDU populations noted during the same time period.

Based on the most recent HIV prevalence findings among different HIV-risk behaviour groups, and on estimates of the size of these risk behaviour groups, a national consensus workshop, held in Jakarta in March 2001, estimated from 80 000 to 120 000 HIV infections in Indonesia in the year 2000. Indonesia is now classified as a country with a concentrated HIV epidemic, primarily among its IDU population.

Estimated clinical  
impact of HIV

Based on an estimated HIV prevalence of about 100 000 in the year 2000, with about half of that number occurring in 1999 and 2000, the calculated number of AIDS deaths for the year 2000 is about 3000. This annual number is projected to increase several times by 2005 (close to 18 000). Most of these AIDS deaths will be occurring in or around Jakarta, because this is where the majority of the HIV-infected IDU populations live.



## China

China is the third largest country and has the largest population in the world. The total population in 2000 was estimated to be over 1.2 billion, with about 720 million in the 15-49 year-old age group. China contains more than one-fifth of the world's population. It is a multinational country, with a large number of ethnic and linguistic groups. The ethnic Chinese, however, constitute more than 90% of the population.

The gross national product per capita in 1999 was US\$783.

China's transition since 1978 from a planned economy to an open market has led to an unprecedented period of economic growth. However, these changes have also been accompanied by changes in social norms and HIV-risk behaviours. With a population of over 1.2 billion, even a limited HIV epidemic in China will result in millions of infections.

**HIV/AIDS situation** As of 2001, the number of reported AIDS cases in China remains small, but all 31 provinces have reported AIDS cases. During the last few years, China has developed a formal HIV surveillance system. During 2000, 101 sentinel sites for 5 target populations (STI clinic attendees, underground FSW, IDU, long-distance truck drivers and antenatal women) were conducted in 31 provinces, autonomous regions and municipalities. This represents an almost doubling of the sentinel sites that were operational in 1997.

All the available HIV/AIDS data collected to date indicate that HIV spread among IDU populations is continuing to increase and is spreading to more provinces. Over half of the 25 IDU sites detected HIV infection, and HIV prevalence rates ranged from 1% to 80% in the provinces of Yunnan, Xinjiang, Guangxi and Sichuan.

There is increasing public health concern that such high prevalence rates among IDU groups in these provinces will ignite an extensive spread of HIV among FSW and their clients. Although a few HIV infections have now been detected among FSW and STI patients in these provinces, the number of HIV infections that are not associated with IDU in these provinces still remains low.

Thus, there are still no conclusive data to indicate that any extensive spread of HIV is occurring among the highest heterosexual risk groups in China. The National HIV Surveillance System has estimated that around 90% of the cumulative number of HIV infections in China are related to IDU and to faulty plasma collection procedures. The latter problem has been aggressively addressed and is now being carefully followed up, but the IDU problem appears to be continuing almost unabated.

Some behavioural-risk assessment data have been collected from IDU and FSW groups. These data show that the levels of specific HIV-risk behaviours continue to be very high among these population groups. A very large proportion of FSW report that they never use condoms (more than 49 % in general, more than 31% in Beijing and 70% Anhui) and



## Distribution of Sentinel Sites of HIV Surveillance in China, 2000





a relatively large proportion of IDU groups continues to share injection equipment (73% in Hunan, 81% in Jiangxi and 100% in Xinjiang). In addition, the finding of high levels of heterosexual risk behaviours in some areas of China, especially among the “mobile working population” has to be addressed aggressively with behaviour change programmes before HIV prevalence rates are detectable by sentinel surveillance.

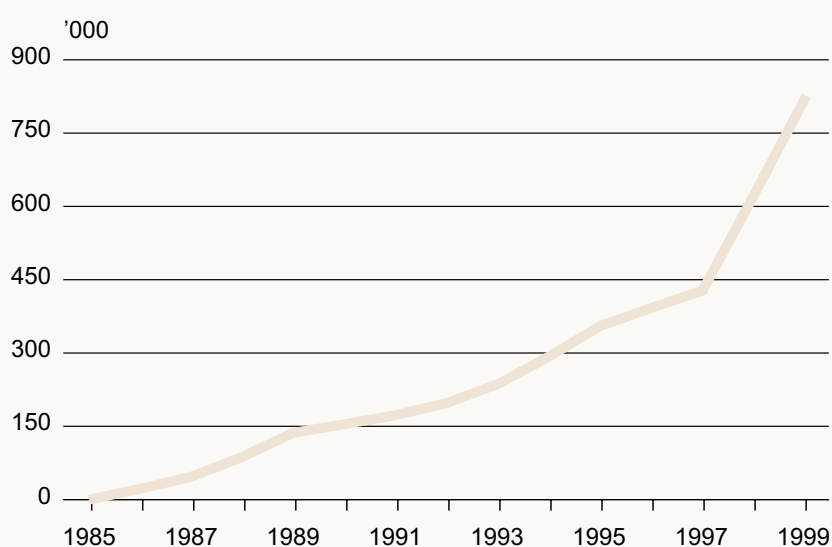
One worrisome indication of the presence of such risk behaviours is the increasing number of reported cases of sexually transmitted infection (STI) and high STI prevalence among risk groups. Reported cases of STI have increased from 5.8 thousand in 1985 to over 836 thousand in 1999 (Figure 9). Considering the fact that reported cases are thought to be seriously underreported, these data suggest the increasing potential for extensive spread of HIV. A recent study in 2000 showed that 86% of female sex workers in Kunming, Yunnan province, and 17% of truck drivers in Tongling, Anhui province were infected with at least one STI.

There are also other indications of increasing risk for heterosexual HIV transmission in China. With official estimates of more than 3 million sex workers in China, condom use and HIV prevalence among sex worker populations are important indicators of heterosexual risk of infection. Data from sentinel surveillance sites show that about 10% of sex workers reported always using condoms with clients, and close to half reported never using condoms.

There are limited, but adequate HIV data to provide reasonable working estimates of HIV prevalence in China, and the official working estimate of 600 000 in the year 2000, developed by the Ministry of Health, appears reasonable.

China faces many challenges in the coming years in preventing rapid growth of HIV infection. Information campaigns have been few and the level of knowledge of prevention measures is low. The illegal nature of injecting drug use and sex work makes populations

**FIGURE 9:**  
Reported STI in China,  
1985-1999



Data source: MOH China

with these behaviours very difficult to reach. Finally, China's increasingly mobile population will pose challenges to effective implementation of public health interventions.

Regardless of whether the overall epidemic potential for extensive heterosexual spread of HIV in China is large or small, the only prudent public health course of action is to promote and aggressively implement a "100% condom use programme" for all commercial and casual sex settings, and harm-reduction programmes for injecting drug users.

Estimated clinical  
impact of HIV

Based on the HIV prevalence estimate of 600 000 in 2000 in the 15-49 year-old population, and on the general shape of the annual HIV incidence curve as well as other assumptions, the annual numbers of AIDS deaths was estimated.

For the year 2000 a total of about 20 000 AIDS deaths in the total 15-49 year-old population is estimated and the numbers projected for 2005 are about 3-5 times greater – about 60 000-100 000. It needs to be fully appreciated that these numbers represent a national total and will be distributed according to the current HIV prevalence that is present in the different provinces. The vast majority of these estimated and projected AIDS cases/deaths will be concentrated in the current high HIV prevalence provinces of Yunnan, Xinjiang, Guangxi and Sichuan. There will be few AIDS cases and deaths in most other provinces, where HIV prevalence is currently low. Similarly, the distribution of paediatric AIDS cases and maternal AIDS orphans and HIV-related tuberculosis cases will be occurring mostly in the provinces with the current highest HIV prevalence rates.



## Hong Kong, China

In July 1997, Hong Kong became a special administrative region of China on the southern coast of China. It comprises the island of Hong Kong and adjacent islets and the Kowloon Peninsula on the mainland of China, as well as the New Territories. About 95% of the people of Hong Kong are Chinese. Hong Kong has one of the highest population densities in the world, averaging some 6310 persons per km<sup>2</sup> (excludes marine population and area of reservoirs). Its population was estimated to be about 7000, with close to 4000 15-49 year-old age group in 2000. Virtually all Hong Kong's people live in urban areas. Hong Kong has a market economy based largely on finance and thriving international trade. Its economy has experienced generally steady growth since the mid-20<sup>th</sup> century. The per capita income is now one of the highest in Asia.

**HIV/AIDS situation** In Hong Kong, the first HIV infection was reported in 1984 and the first case of AIDS in 1985. Since then, numbers of reported cases have been growing steadily. At the end of 2000, the cumulative reported number of HIV infections was 1542, of which 500 had progressed to AIDS. The majority of the initial HIV/AIDS cases identified in Hong Kong were in MSM and male haemophilia patients. There are no data to suggest that any significant self-sustaining heterosexual spread of HIV is present in Hong Kong. The majority of HIV infections detected among heterosexuals during the 1990s were either acquired outside Hong Kong or were non-Chinese Asians or their contacts in Hong Kong. Small pockets of IDU groups have been identified in Hong Kong, but to date no extensive HIV transmission has occurred among these groups. Several surveys in Hong Kong have shown that HIV prevalence among pregnant women is about one in every 4000.

The current behavioural surveillance system collects data from existing surveys and specifically designed surveys. On average, the rate of needle sharing among street addicts has been less than 20 % in the last few years. About 80%-90% of those attending Government Social Hygiene Clinics report visiting sex workers. About 50% of adult men attending Social Hygiene Clinics in 1999 reported using a condom for their last sex with sex workers.

**Estimated clinical impact of HIV** Hong Kong has been able to provide highly active antiretroviral therapy (HAART) to HIV-infected residents since the mid-1990s. The number of HIV-infected persons who would have developed AIDS has been reduced in recent years as a result of their access to effective treatment. However, a significant proportion of the estimated 2-3 thousand HIV-infected persons in Hong Kong have not yet been identified, and many HIV-infected persons are first detected after the onset of AIDS defining conditions. The number of newly reported AIDS cases in Hong Kong has stabilized at about 45 to 75 cases per year since the mid-1990s.

## Macao, China

Macao became a special administrative region of China as of December 1999. It is located on the southern coast of China to the west of the Pearl River Delta. It comprises the peninsula of Macao and the two islands of Taipa and Coloane, with a total land area of 23.8 km<sup>2</sup>. As of 31 December 2000, Macao's local population numbered 438 000 inhabitants. Population density is over 18 000/km<sup>2</sup>, with the northern part of the peninsula of Macao considered one of the most densely populated areas in the world. Macao's economy has been experiencing rapid growth since the 1980s. Public health care in Macao is comparable with that of developed countries. The average life span for both sexes is over 75 years old.

### HIV/AIDS situation

In Macao, the first HIV infection was reported in 1986 and the first case of AIDS in 1989. The Department of Health of Macao has, since 1986, been conducting several surveillance activities. The different approaches used include, among others: an unlinked and anonymous serosurveillance that includes outpatients more than 15 years old and pregnant women attending antenatal consultations as target populations; and HIV screening for selected groups, such as blood donors, tuberculosis patients, prisoners, injecting drug users (IDU) referred by NGOs, and entertainment workers. Since 1986 until the end of December 2000, 230 HIV infections had been reported, 70.9% diagnosed in temporary residents working in the entertainment industry. The HIV transmission in Macao is essentially sexual: the most important route of transmission has been heterosexual (71.7%). A large proportion of HIV cases have been found among women, transmitted through heterosexual contact, representing 67.8% of all new cases (female to male ratio: 2.1 to 1). If the temporary residents working in the entertainment industry are excluded from the data, the cumulative number of HIV cases from 1986 until the end of December 2000 is 67, and the pattern profile of HIV infection in Macao becomes different: men are responsible for 68.7% of all new HIV cases (male to female ratio: 2.3 to 1) and for 81.0% of AIDS cases; the principal route of transmission is heterosexual, with a percentage of 35.8%; injecting drug use transmission accounts for 14.9% of infections; and the homosexual route for 13.4%. Among the 67 HIV cases detected in the Macao resident population, 21 (31.3%) have progressed to AIDS. No estimation of HIV/AIDS was developed for Macao.

The data obtained show that the HIV spread among Macao's general population has been very limited, despite the tendency for increase among some high -risk behaviour groups, such as IDUs. Surveillance of antenatal clinic attendees in Macao, has shown that HIV prevalence is still low in that group.

Since the mid-1990s, Macao has been able to provide treatment to HIV-infected residents. However, many of HIV-infected persons have been first detected after the onset of AIDS defining conditions. The number of newly reported AIDS cases in Macao has been, since the mid-1990s, about 2 to 4 per year.

## Sri Lanka

Sri Lanka is an island country in the Indian Ocean, separated from the south-eastern coast of peninsular India. Its estimated population in 2000 was about 19.2 million, with about 10.3 million in the 15-49 year-old age group. The Sinhalese are the predominant ethnic group, constituting about three-quarters of the population. Other ethnic groups include the Tamils and the Muslims.

Sri Lanka has a developing mixed (public and private) economy, largely based on agriculture, services and light industry. The creation of new jobs has not kept pace with the growth of the population, and unemployment is widespread. The GNP is growing faster than the population; the GNP per capita, however, is very low by world standards.

**HIV/AIDS situation** The available HIV/AIDS data for Sri Lanka indicate that extensive spread of HIV had not occurred as of the year 2001. HIV testing among antenatal clinic attendees was conducted in the capital, Colombo, in 1990, 1993, 1995 and 1996. No evidence of HIV infection was detected. Outside Colombo, HIV testing of ANC women took place in various sites, including Anuradhapura, Badulla, Galle, Kandy, Kurunegala and Ratnapura, at various times between 1990 and 1996. As in Colombo, no evidence of HIV infection was found among the antenatal clinic women tested at that time. Among sex workers tested in Colombo from 1990 through 1998, evidence of HIV infection was found in only one site, in 1993, where 0.2% of the sex workers tested were HIV-positive. Outside Colombo, sex workers were tested for HIV infection in Kandy, Anuradhapura, Galle, Kurunegala, Ratnapura and Badulla between 1993 and 1998. Evidence of HIV infection was found in only one site, Kurunegala, and only in 1995, where 0.5% of sex workers tested were HIV-positive.

The best estimate of HIV prevalence in Sri Lanka, as of the year 2001, is about 8500. There are insufficient studies and data on the patterns and prevalence of HIV risk behaviours in Sri Lanka to suggest that the potential for epidemic or more extensive spread of HIV is very low. More systematic sentinel HIV surveillance needs to be developed, with primary emphasis on high-risk groups. In addition, baseline behavioural surveillance studies/surveys need to be implemented as soon as possible. Support for HIV/AIDS/STD programmes needs to be expanded and focused on high-risk groups.

**Estimated clinical impact of HIV** Based on an estimated HIV prevalence of 8500 in the year 2000, the number of AIDS deaths in 2000 is calculated to be about 350 and it is projected that this number will gradually increase to over 1000 in 2005.

## New Zealand

New Zealand is an island nation in the South Pacific, lying about 1000 miles south-east of Australia. New Zealand has two main islands, the North and South, separated by the 20-mile wide Cook Strait, and a number of small islands. The estimated population in 2000 was about 3.8 million, with close to 2 million in the 15-49 year-old age group.

The principal ethnic element of New Zealand's population (about 78%) is of European origin (mostly British); 15% are Maori and 6% Pacific islanders. The proportion of people of Asian descent is projected to rise to 8% of the population by 2016. Five-sixths of the population lives in urban areas, and most migration within the country takes place between urban areas.

New Zealand has a developed market economy largely based on agriculture, small-scale industries, and services. Economic growth has been kept low by dependence on imported fuels and capital and consumer goods. The GNP per capita is within the range of the developed countries of the world.

### HIV/AIDS situation

The first reported AIDS cases in New Zealand were identified in 1983. The annual number of new HIV infections has remained steady at an average of about 80-90 per year, showing a growing pool of HIV cases. The number of current HIV infections was estimated to be 1200 in 2000. However, due to the availability of antiretroviral drugs, fewer persons with HIV infection are developing AIDS, and those with AIDS are living longer. The number of newly reported AIDS cases has been lower than 50 per year in recent years. According to the New Zealand AIDS Epidemic Group, 50% of the 165 people reported to have AIDS since 1996 were still alive in 2000.

Whilst 80% of total AIDS notifications to date are amongst men who have sex with men, the proportion infected through heterosexual contact has increased and accounted for 18.5% of AIDS notifications and 42% of reported HIV infections in 2000. People infected through heterosexual transmission are predominantly from countries with high rates of heterosexual transmission. Less than one-third of the newly detected HIV infections in 2000 occurred in New Zealand. Data from seroprevalence surveys (1996-1997) show an HIV prevalence of 3 % in MSM, 0.3% in IDU and 0.09% in female heterosexuals.

### Estimated clinical impact of HIV

The confirmed number of new AIDS cases in 2000 was 27. It is projected that the number will be similar in 2005.



## The Maldives

The Maldives is a small independent island nation consisting of a chain of about 1300 small coral islands and sandbanks (roughly 202 of which are inhabited), grouped in clusters, or atolls, in the Indian Ocean. The Maldivians are a mixed people, speaking an Indo-European language called Divehi. With the exception of those living in the capital Male', the only relatively large settlement in the Maldives, the inhabitants of the Maldives live in villages on small islands in scattered atolls. About 50 of the islands have more than 1000 inhabitants and the southern islands are more densely populated than the northern ones. Its population was estimated to be about 269 000 in 2000.

The Maldives has a developing economy based on tourism and fishing. The GNP per capita is among the lowest in the world. Tourism is a fast-growing sector of the economy. Resort islands and modern hotels in Male' attract increasing numbers of tourists during the winter months.

**HIV/AIDS situation** As of mid-2001, a total of eleven HIV infections and five AIDS cases had been detected in the Maldives and virtually all of these cases had likely acquired their infection outside the country. It was estimated that by the year 2000, there were less than 100 HIV infections in Maldives.



## The Lao People's Democratic Republic

The Lao People's Democratic Republic is a landlocked country in the centre of the Indo-Chinese peninsula of south-east Asia. Its total population in 2000 was estimated to be about 5.2 million, with 2.4 million in the 15-49 year-old age group. Cambodia, China, Myanmar, Thailand and Viet Nam surround the country. The Lao People's Democratic Republic has a slowly developing, largely centrally planned economy based mainly on agriculture and international aid. The GNP per capita in 1999 was one of the lowest in the world. Since 1986, the country has been moving towards a free market economy and is increasingly opening its borders to foreign investments and visitors.

### HIV/AIDS situation

The first HIV infection in the Lao People's Democratic Republic was identified in 1990 in a returning Lao female who was suspected to be a FSW. The first AIDS case was reported in 1992 in a person with a history of frequent travel to Bokeo, a province adjacent to Chiang rai, a northern Thai province. From 1990 to December 2000, a total of about 61 130 persons were screened/tested for HIV infection and 717 were found to be positive, with 190 AIDS cases reported, including 72 deaths. The majority of the identified HIV infections were in persons with clinical illnesses and who were suspected of having acquired their infection outside of the country via heterosexual intercourse.

IDU is believed to be very low or non-existent, but no studies have been conducted to confirm this impression. Data from the national blood centre confirm that HIV prevalence is very low – of over 8000 blood donors tested in 1997 (about 5000 from Vientiane), only one HIV-positive was found. Even although the available data are limited and may be very unrepresentative, collectively they indicate that HIV prevalence in the Lao People's Democratic Republic is currently still very low.

The results of the first complete HIV sentinel surveillance round in the Lao People's Democratic Republic, carried out in 2000, were reported in early 2001. More than 800 "service women", who are considered indirect sex workers, were tested in three sites. In the capital city of Vientiane, about 1% of the almost 300 service women were found to be HIV-positive and in Savannakhet, the same rate of HIV-positivity was observed among the same number of service women tested. Overall, less than 1% of these indirect sex workers were found to be HIV-positive. No details were provided as to whether these infected females may have acquired their HIV infection in or outside the country.

### Risk behaviours

In the past few years, the Lao People's Democratic Republic has witnessed a massive expansion in economic activity, resulting in significant increases in domestic and cross-border population movement. The number of sex workers has also been increasing. Community-based surveys on condom use of PSI in Vientiane in 1999 showed that, among those who had had more than three sexual partners over the previous 12 months, 38 % had never used condoms. The Lao People's Democratic Republic initiated the behavioural surveillance survey among specific subpopulations in mid June 2000. The data showed



that 73 % of service women had consistently used condoms with clients in the previous month. Of the service women who had had commercial sex in the past year, almost all (95.5%) reported having had only one client on the last day worked (mean number: 1.1). Between one quarter and one third of truck drivers and police reported "had had sex with a commercial partner in the last 12 months". About two thirds of the police and military, and three quarters of truck drivers said they always used condoms with a paid partner.

## STI data

National STD surveillance was established in mid 1999. Studies indicated a 12% rate of chlamydia among 100 antenatal clinic attendees in 1997. Data from the Lao Red Cross blood transfusion service on the prevalence of syphilis markers showed 3% to be positive (out of 4824 tests) in 1999. A combined HIV Sero-sentinel Surveillance and STD Prevalence Survey was implemented in early 2001 among vulnerable groups such as female service women, female factory workers and long distance truck drivers. The results are not yet available.

Estimated clinical  
impact of HIV

HIV prevalence in the Lao People's democratic Republic was estimated, as of the year 2000, to be 1300, or 0.05% of the 15-49 year-old population (UNAIDS/WHO working group). Based on this HIV prevalence, the clinical case load of AIDS and other HIV-related diseases and conditions are estimated and projected to be relatively small – ranging from less than 100 annual AIDS deaths in the year 2000 to over 200 in 2005.

## The Philippines

The Philippines is an archipelago of about 7100 islands and islets lying about 500 miles off the south-eastern coast of Asia. The population in 2000 was estimated to be over 80 million, with about 38.5 million in the 15-49 year-old age group. More than four-fifths of the population is Roman Catholic, and a sizable minority is Muslim. Population density in the Philippines is relatively high. Nearly two-fifths are younger than 15 years of age. Heavy migration from rural to urban areas has caused overcrowding, particularly in metropolitan Manila. About two-fifths of the country's population is urban.

The economy of the Philippines is based largely on agriculture, light industry, and services. A market economy predominates, although intervention by the Government increased in the late 20<sup>th</sup> century. Prices have tended to rise more rapidly than purchasing power, and wages are among the lowest in east Asia. The GNP per capita, which has a negative real growth rate, is similar to that of other developing countries.

**HIV/AIDS situation** An HSS system was developed during the early 1990s that included high behavioural risk groups in several major urban areas. The findings from this surveillance system indicated that HIV prevalence was very low, since only an occasional and sporadic HIV infection was found among registered female sex workers (RFSW) who were included in the surveillance sampling scheme (Table 4).

In 1999, the Philippine Red Cross tested 500 000 bags of blood and found only one confirmed HIV-positive sample. No significant transmission of HIV has yet been detected in the Philippines and, as a result, the official national HIV prevalence estimate has been reduced from an initial 50 000 to 26 000, and most recently to about 10 000 (range: 5000-13 000).

All of the collective HIV/AIDS surveillance data in the Philippines support the basic conclusion that extensive transmission of HIV has not occurred, even within the highest HIV-risk behaviour groups such as MSM, IDU and FSW. This low and slow increase of HIV prevalence in the Philippines is due to the low infection rate of

**Table 4:** HIV Prevalence rates found among RFSW in HSS rounds – 1996-2000

Year	1996	1997	1998	1999	2000
N. pos./N. tested	2/3069	4/3028	5/2672	2/3002	4/3000
HIV prevalence	0.07%	0.13%	0.19%	0.07%	0.13%
Data source: DPH Philippines					



HIV via sexual intercourse and the generally lower prevalence of HIV-risk behaviours present in the Philippines compared with those Asian countries where extensive transmission of HIV has been documented. Early recognition of the epidemic, mobilization of relevant sectors and partners, and implementation of targeted intervention programmes have contributed to keeping the epidemic low and slow in the country.

Risk behaviours	A behavioural surveillance survey was conducted from 1997. There was no significant change in the trend for condom use during the last sex with a non-regular partner among registered sex workers (from 64% in 1997 to 65% in 2000). As a result of outreach interventions, the rate among freelance sex workers increased from 55% in 1997 to 67% in 2000. Sex workers have on average a low number of clients (2.2-3.5 per week, 1999). A recent study indicated that 13% of men had two or more sex partners. The percentage of IDUs who share needles decreased from 77% in 1997 to 52 % in 2000.
STI situation	Serological testing of syphilis has been incorporated into the HSS since 1993. STI prevalence surveys with different laboratory methods have been conducted since 1991. Recent surveys show that the prevalence of chlamydia is high among sex workers, ranging from 27% to 36%. The syphilis rate in this group was of <1% to 5 %. The gonorrhoea rate varied from 2.6% to 25%. A high level of STIs are also found among low-risk groups. For example, Chlamydia was found in 7.5% to 18% of antenatal women in STI surveys in 1998.
Estimated clinical impact of HIV	Based on an estimated HIV prevalence of 5000 (range 5000-13 000) in the year 2000, the estimated number of AIDS deaths in the year 2000 is about 200. In 2005 the estimated annual number is expected to range from 500-1000.

## Bangladesh

Bangladesh is a relatively small coastal country in south central Asia. To the south, Bangladesh has an irregular coastline fronting the Bay of Bengal and shares land borders with India and Myanmar. Its estimated total population in 2000 was about 128 million, with 68 million in the 15-49 year-old age group.

Bangladesh is one of the most densely populated countries in the world, with the highest densities occurring in and around the capital city of Dhaka. It is also a predominantly rural country, with only about one-quarter of the population living in urban areas. Rural areas are often so thickly settled that it is difficult to distinguish any well-defined pattern of individual villages. Bangladesh has a high rate of population growth, and almost one-half of the population is under 15 years of age. Both birth and death rates are far above world averages.

Bangladesh has a developing mixed economy that is heavily based upon agriculture. Almost two-fifths of the GDP originates from agriculture, followed by services, and transportation and communication. Although the GNP is growing somewhat more rapidly than the population, the GNP per capita is among the lowest in the world. Severe overcrowding, an inadequate food supply and poor sanitary conditions have combined to create extremely poor health conditions in Bangladesh.

### HIV/AIDS situation

As with virtually all countries in Asia, the first cases of AIDS or HIV infection in Bangladesh, detected during the late 1980s and early 1990s, were either in foreign visitors or in citizens who returned from international travel. All of the known HIV-risk behaviours and factors – FSW, MSM, IDU and “high” rates of STI – are acknowledged to be present in Bangladesh. As a result, there is increasing concern that marked epidemic spread of HIV might occur in a manner similar to that documented in several neighbouring countries (parts of India, Myanmar and Thailand).

Scant data are available to provide accurate definitions of the distributions or to quantify the prevalence of these risk behaviours and factors in Bangladesh. Although the number of heroin addicts is estimated to be about 100 000, it appears that the majority of heroin users smoke rather than inject the drug. Almost no data are available to estimate the distribution and number MSM, but it is acknowledged that they exist in Bangladesh.

FSW are present throughout Bangladesh; prostitution areas and brothels are known, but estimates of the number of prostitutes vary widely. In addition, it is known that “floating” prostitutes are present in “large” numbers, but their precise distribution and prevalence are not well known. It is suspected that “large” numbers of young and mostly single female textile and garment workers may also supplement their low wages by occasional prostitution.

In 1998-1999, national sentinel surveillance surveys for HIV and syphilis infections were carried out. In addition, behavioural surveys among selected high-risk “groups” – brothel-based FSW, STI patients, truckers



and IDU – were also conducted. HIV infection in the highest HIV-risk behaviour groups continues to be low. About 2-3% of IDU and less than 1% of FSW were found to be infected with HIV. As of mid-1999, a cumulative total of about 100 HIV-infected persons and a dozen AIDS cases have been identified in Bangladesh. Based on the limited data and on the findings of the national HSS surveys, the estimate of the number of HIV infections in Bangladesh made by WHO/UNAIDS for the year 2000 (about 13 000) appears reasonable.

Estimated clinical impact of HIV      Based on the HIV prevalence estimate of about 13 000 in 2000, it has been calculated that the annual number of adult AIDS cases in Bangladesh was 1100 in 2000 and will be about 1700 in 2005.

## Japan

Japan is an industrialized island country lying off the east coast of Asia. Its estimated population in 2000 was close to 127 million, with 58 million in the 15-49 year-old age group.

Japan has a prosperous and well-developed economy largely based on manufacturing and services. A market economy predominates, although the Government exercises effective administrative guidance in the private sector. Japan's GNP per capita is among the highest in the world.

### HIV/AIDS situation

HIV prevalence rates in Japan continue to remain well below 1% for most HIV-risk behaviour groups, except among female sex workers of foreign nationality (2.7% from 1987-1999). Most reported HIV/AIDS cases in Japan during the mid-to-late 1980s and early 1990s were due to HIV-infected blood products that were imported for the treatment of haemophilia patients. A third of the AIDS cases (33.3%) reported in 1998 were in those haemophilia patients who were infected through imported blood coagulation factor products.

The high percentage of haemophilia AIDS cases is still the distinctive characteristic of HIV infection in Japan and is not seen in other countries in the world. However, in 2000, about 78% of newly diagnosed HIV infections appear to have been acquired through sexual contact. One of the characteristics in recent years is that the infection through sexual contacts in Japan is getting higher among Japanese men. Almost all HIV infections in Japan are related to imported infections (including the haemophilia infections) and then some limited transmission from these infected persons to their regular sex partners. Behavioural data show low condom use, both in the general population and among FSW (6% to 25%).

The Ministry of Health and Welfare Panel revised estimates and projections of HIV in Japan in 1999. Their estimates suggest that, by the end of 1998, 8000 persons were living with HIV (prevalence of <0.01% in people aged 15-49 years).

### Estimated clinical impact of HIV

The epidemiology of HIV infection in Japan is unique in that several thousand infections of male haemophilia patients occurred within a few years during the early to mid-1980s. Aside from this initial epidemic, HIV transmission has been minimal and mostly limited to imported infections and some limited transmission from the several thousand HIV infections that were present in Japan since the mid-1980s. Based on this pattern of HIV infection and an estimated HIV prevalence of about 8000 in 1998, the annual number of AIDS deaths in Japan in the year 2000 can be calculated to be about 600-700. A similar annual number of AIDS deaths can be projected for 2005. These estimated/projected numbers may be much lower, depending on the extent to which effective anti-HIV treatment is provided in Japan.



## The Republic of Korea

The Republic of Korea is located in the southern Korean peninsula in east Asia. Its estimated population in 2000 was about 52.7 million, with about 22.7 million in the 15-49 year-old age group. The Republic of Korea has a predominantly market economy based largely on services and light and heavy industries. Economic growth has been heavily dependent on exports of manufactures. The GNP is growing much faster than the population. The GNP per capita is similar to those of the other rapidly developing east Asian countries and was ranked in the top 10 countries in Asia in 2000.

**HIV/AIDS situation** The first case of HIV infection in the Republic of Korea was reported in 1985 and the first AIDS case in 1987. An estimated 3800 HIV-infected individuals were living in the country in 2000 (prevalence of less than 0.1% among people aged 15 to 49 years). The great majority (93%) of HIV infections are estimated to be sexually transmitted, with 13% occurring among women. National seroprevalence surveys have identified only sporadic HIV infection.

**Estimated clinical impact of HIV** Based on an estimated HIV prevalence of about 3800 in the year 2000, the annual number of AIDS deaths is calculated to be between 200-300 in 2000 and is projected to increase to between 300-400 in 2005. The annual numbers of HIV-related tuberculosis and of paediatric AIDS cases and AIDS-related orphans will be less than the estimated annual numbers of adult AIDS deaths.



## Democratic People's Republic of Korea

The Democratic People's Republic of Korea occupies the northern half of the Korean peninsula in east Asia. Its population was estimated in 2000 to be about 23.7 million, with about 13.3 million in the 15-49 year-old age group. The Democratic People's Republic of Korea has a command (centrally planned) economy based largely on heavy industries and agriculture. The GNP per capita remains low by world standards.

### HIV/AIDS situation

Scant HIV/AIDS data are available from The Democratic People's Republic of Korea. It is estimated that as of the year 2000, that there were fewer than 100 HIV infections in the country.



## Mongolia

Mongolia is a landlocked country, located between Russia to the north and China to the south, in north central Asia. It is Asia's seventh largest country in area but one of its smallest in population. Its estimated population in 2000 was about 2.5 million, with about 1.4 million in the 15-49 year-old age group.

Almost four-fifths of the populace are Khalkha-speaking Mongols. The remainder consists of other Mongols, Kazaks, Russians and some Chinese. People are encouraged by the Government to migrate from rural to urban areas, and about three-fifths of the total population is now urban. Until 1990, Mongolia had a socialist centrally planned economy on the Soviet model. Thereafter, democratic reforms (including a new constitution in 1992) began the country's conversion to a market economy.

### HIV/AIDS situation

Mongolia has remained nearly free from HIV over the past two decades, as evidenced by the fact that only three HIV/AIDS cases have been reported as of July 2001. The first HIV infection in the country was reported in 1992 in a male homosexual who acquired his infection abroad and died in 1999. The second case was detected through screening of FSW in December 1997. The third case was diagnosed as AIDS case in a woman at the National Center of Communicable Diseases. HIV surveillance activities and testing started in 1987, with an average of 50 000 - 70 000 tests being conducted annually. HIV testing has since been done annually for blood donors, high-risk groups (e.g., STI clinic attendees, FSW, homosexuals) and voluntary clients. In 1998, only 1 of 101 FSW tested was HIV-positive. No other positive tests were detected in other sentinel surveillance populations. It is estimated that, in the year 2000, there were fewer than 100 HIV infections in Mongolia. No other estimates or projections for HIV/AIDS in Mongolia have been developed.

## Bhutan

The Kingdom of Bhutan is a sovereign kingdom in the Himalayas, bounded by India and Tibet, China. Bhutan's rugged mountains and dense forests long rendered it inaccessible to the outside world until well into the 20<sup>th</sup> century. The building of a road network connecting Bhutan with India in the 1960s finally brought to an end Bhutan's historic isolation. From that time on, Bhutan embarked on a programme to build roads and hospitals and to create a system of secular education. Its governmental institutions were also modernized. The Bhutanese economy is mainly agrarian; most of the population is engaged in agriculture and livestock raising. The first case of HIV/AIDS in Bhutan was reported in 1993. Although the first HIV/AIDS was diagnosed in the country in 1993, the testing of army recruits that year did not find any infection in this population group.

### HIV/AIDS situation

As of April 2001, 22 persons have been diagnosed with HIV infection, out of which 4 have died. Recent trends show an increase in the number of people diagnosed with HIV/AIDS and as a result, the government has redoubled its efforts for preventing HIV and its implications to the Bhutanese population. The issue is considered important because the incidence of STI have been quite significant in the past. The current number of HIV estimates is about 100 in 2000.



## Brunei Darussalam

Brunei is an independent Islamic sultanate occupying an enclave on the north-western coast of the island of Borneo. The estimated population in 2000 was 321 000, with 178 000 in the 15-49 year-old age group. Brunei has a mixture of south-east Asian ethnic groups. About two-thirds of the population is Malay, nearly one-fifth is Chinese, and the remainder are indigenous peoples and Indians. Almost two-thirds of the people are Muslims, 12% are Buddhists, 9% are Christians and, in the remote interior, there are a few animists. Approximately two-thirds of the population is urban.

Brunei has a developing market economy based on the exploitation of petroleum and natural gas reserves. A relatively small population combined with extremely rapid economic growth, particularly during the 1970s, has allowed the state to give its citizens one of the highest per capita incomes in Asia.

### HIV/AIDS situation

The first HIV infection in Brunei was identified in 1986. The majority of reported infections have occurred among immigrant workers, mostly men and heterosexuals. By the end of August 2000, a cumulative total of 521 HIV infections and only 16 AIDS cases had been reported. There are very few data on STI (reported seroprevalence of syphilis was low 0.1-1.3% during the period 1997-1998) and no data available on risk behaviours.

The cumulative number of long-term residents reported as HIV cases remains very low (less than 20 up to 1999). It is estimated that as of the year 2000, there were less than 100 HIV infections in Brunei.

### Estimated clinical impact of HIV

Since the estimated prevalence of HIV in Brunei is less than 100, the estimated number of AIDS deaths in the year 2000 and 2005 cannot be expected to be more than about five to six in each of these years.

## South Pacific island countries and territories

### HIV/AIDS situation

HIV/AIDS data from 20 Pacific Island countries and territories have been collected and analysed by the WHO regional office in Manila. These countries and territories included American Samoa, Cook Islands, Fiji, French Polynesia, Guam, Kiribati, the Marshall Islands, the Federated States of Micronesia, Nauru, New Caledonia, Niue, the Commonwealth of the Northern Mariana Islands, Palau, Samoa, Solomon Islands, Tokelau, Tonga, Tuvalu, Vanuatu, and Wallis and Futuna. The estimated population of these countries in 2000 was about 2.8 million, with about 1.3 million in the 15-49 year-old age group.

Only sporadic HIV/AIDS cases have been reported from throughout the South Pacific, which suggests that HIV seroprevalence remains low in this region. As of early 2000, over 600 HIV infections (including more than 200 AIDS cases) had been reported to the WHO Regional Office for Western Pacific. Three territories (French Polynesia, Guam and New Caledonia) have accounted for 80% of reported HIV infections and over 80% of AIDS cases. Five countries/territories (American Samoa, Cook Islands, Niue, Tokelau, and Vanuatu) have not as yet reported any HIV infections. The majority of reported cases have occurred among men, with sexual contact with other men being the most frequently reported mode of transmission. However, the proportion of heterosexual cases has been increasing over the last few years.

Few HIV seroprevalence studies have been conducted in the South Pacific. Limited data have been collected in some countries among populations of blood donors, pregnant women, STI clinic patients and immigrant groups. Most of these studies have identified few, if any HIV infections. However, the sample sizes were small and these findings should be interpreted with caution. It appears from the limited HIV/AIDS data available that most of the HIV infections in the South Pacific are imported and that there are, as of 2001, no data to suggest that any significant or sustained HIV transmission is occurring in these island countries and territories. The HIV prevalence was estimated, as of the year 2000, to be <0.1% of the 15-49 year-old population of these countries.

Surveys conducted in some countries and territories show that curable STI are common. In 2000, studies of women attending antenatal care in Samoa and Vanuatu showed that one in three women had an STI. The highest rates of infection (up to 50%) were found in women below 25 years of age. HIV/AIDS programmes in the South Pacific will need to continue to focus on prevention and control of treatable STI, such as syphilis and gonorrhoea and to develop some HIV surveillance among persons with the highest prevalence of sexual risk behaviours.





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*Annex* 1

## Natural history of HIV infection

AIDS (acquired immunodeficiency syndrome) is a severe disease syndrome that represents the late clinical stage of infection with HIV (human immunodeficiency virus). The syndrome was first recognized in 1981, but probably existed at a low endemic level in Central Africa before epidemic HIV spread began to occur in several areas of the world during the 1970s.

### Progression from asymptomatic HIV infection to clinical illness and AIDS

Initial infection with HIV is indicated by the presence of HIV-specific antibodies, often without any other signs or symptoms. A substantial minority of infected persons, however, experience a short, mononucleosis-like illness about 2-5 weeks after infection. During this acute phase of infection, there may be a significant depression of the cellular immune system and infected persons at this early stage are considered extremely infectious. Subsequently, the immune system rebounds to generally normal levels and the infected person becomes asymptomatic for periods ranging from many months to many years.

HIV infection attacks the cellular immune system. Continued damage to the immune system eventually makes HIV-infected individuals susceptible to various opportunistic infections and cancers. Initial illnesses related to the increasing immune deficiency caused by HIV are generally mild to moderate in severity, and tend to be nonspecific. These illnesses have been designated AIDS-related-complex, or ARC, but there has never been a universally accepted definition of ARC. The first infections described in patients with AIDS were due to ubiquitous organisms that do not usually cause disease in healthy persons; the cancers that developed in AIDS patients were of types that had been diagnosed only rarely in the past. Subsequently, it became clear that persons with HIV infection could contract almost any common or uncommon infectious disease, or some malignancies, because of their immune deficiency. The diagnosis of AIDS is complex and often difficult because of the many conditions that are considered necessary to meet different surveillance definitions of the syndrome.

The time period for progression from HIV infection to symptomatic disease is highly variable: symptoms may occur within a year, although rarely, or may take more than 10 years to appear. Over a variable time period from many months to many years, infected persons begin to develop clinical disease related to progressively increasing immune deficiency. Early symptoms may include swollen lymph nodes, night sweats, fever, diarrhoea, profound weight loss, fatigue and uncommon infections. Continued destruction of the immune system leads to AIDS, which is characterized by life-threatening opportunistic infections and cancers. Based on detailed cohort studies, primarily among white homosexual men in the USA, it is believed that the median period for the development of severe immune deficiency that results in AIDS ranges from 8-10 years.

There was initial speculation that annual progression rates from HIV infection to AIDS were shorter on average in females than males, and in developing countries compared with developed countries, but the limited data available suggest that no major differences exist.



The median interval from HIV infection to the development of severe immune deficiency appears to be similar in all populations (i.e., in developed and developing countries) and is estimated to be about 7-8 years. However, there is a consensus that the survival period from the development of severe immune deficiency to death is much shorter in most developing countries compared with developed countries, where the advent of HAART therapy has significantly increased survival of patients with moderate immune deficiency related to their HIV infection. A recent review of cohort studies in Uganda, Thailand and Haiti indicates that the median interval from HIV infection to death is 9 years. This median period will now be uniformly used to calculate annual HIV incidence and annual deaths due to immune deficiency related to HIV infection.

Of all host factors that have been studied, only age at acquisition of HIV infection appears to have a major effect on progression to the development of AIDS. A detailed analysis of annual progression to AIDS by age at HIV acquisition for the HIV infected haemophilia cohort in the USA shows that younger members of this cohort progress to AIDS more slowly than older men. The average time to AIDS when infection was acquired after age 35 was about 7-8 years, while that for males who were initially infected when they were less than 35 years of age was about 12 years. Several female cohort studies in European countries, reported during the early 1990s, indicate that age-specific progression rates in women are similar to those reported for men.

### Survival time after diagnosis of AIDS and advent of anti-HIV treatment

The survival time after onset of severe AIDS-characteristic illnesses is also variable, but, prior to the development of effective anti-HIV therapy, average survival time was about 2-4 years in most developed countries and about 6 months or less in developing countries. The shorter survival periods in developing regions was most likely due to diagnosis at a later stage of disease and limited access to good supportive medical care. In the absence of anti-HIV drug treatment, the case/fatality rate attributable to HIV is among the highest of any human infectious agent.

The proportion of HIV infected persons who, in the absence of anti-HIV treatment, will ultimately develop AIDS has been estimated to be over 90%. Less than 5% of HIV-infected persons who have been followed with detailed clinical and laboratory studies for 10 years or longer have been classified as possible non-progressors. In the absence of effective anti-HIV treatment, the AIDS case-fatality rate is very high: most (80-90%) patients in developed countries die within 2-4 years after the diagnosis of AIDS is made. However, in the United States of America and most developed countries, routine use of prophylactic drugs for the prevention of *P. carinii* pneumonia and other opportunistic infections was able to delay the development of AIDS and death significantly, even prior to the routine availability of effective anti-HIV treatment in the mid-1990s. In Asia, routine access to effective anti-HIV treatment is variable. Access ranges from one extreme, such as in Hong Kong where triple anti-HIV drug therapy is provided to all Hong Kong residents, to the other extreme in the poorer Asian countries, such as Cambodia and Myanmar, where anti-HIV drug treatment is virtually unavailable.

## Annex 2

# Mother-to-infant transmission of HIV

As of the start of the new millennium, our understanding of mother-to-infant transmission of HIV has improved greatly, especially regarding the prominent role of breast-feeding. During the late 1980s and early 1990s, field studies consistently showed that mother-to-infant transmission rates in Africa were almost twice as high as in Europe. Even although breast-feeding was known to be a possible factor to explain this marked difference in HIV transmission rates, there was great reluctance by most official agencies to accept this association with breast-feeding without additional and more conclusive data. By the mid-to-late 1990s, increasingly available data confirmed that breast-feeding by HIV-infected mothers did not represent just a small increment of risk, but increased HIV transmission to their infants by up to 50%. It is now mostly accepted that about 25% of HIV-infected pregnant females will transmit HIV infection to their infants – about 5% *in utero* during gestation, about 15% around the delivery period, and about 10% in the postnatal period, primarily due to breast-feeding.

Treatment of pregnant women with anti-HIV drugs can result in a marked reduction of infant infections. Up until mid-1999, the only drug shown to reduce perinatal HIV transmission was zidovudine (ZDV), when administered in the following regimen. First it had to be given orally to the mother after 14 weeks gestation and continued throughout pregnancy, and then given intravenously to the mother during the intrapartum period. ZDV also had to be administered orally to the newborn infant for the first 6 weeks of life. This complex chemoprophylactic regimen was shown to reduce perinatal HIV transmission by over 60%. A shorter course of ZDV treatment has subsequently been shown to reduce the risk of perinatal transmission by about 40%. A study reported from Uganda in July 1999 found that giving a single dose of nevirapine to HIV infected females during labour, followed by a single dose to their newborn babies within 3 days of birth, gave better results than both the long and short ZDV regimens. Safer delivery practices (i.e., avoiding episiotomies and premature rupture of membranes) have also been shown to be partially effective in reducing perinatal HIV transmission. Finally, a programme of replacement feeding of the infant (formula or wet-nursing from HIV-negative women) can increase prevention of HIV transmission via breast-feeding.

Although a short-term regimen of ZDV can significantly reduce the rates of mother-to-infant HIV transmission, by 18 months of age the benefits to the infant of ZDV treatment are offset by infection via breast-feeding, according to the most recently available PETRA study data released in early July 2000. Conducted under the auspices of UNAIDS, the PETRA trial followed the outcome of 1754 HIV-infected women and their infants after they were randomized to one of four arms. These included ZDV and 3TC administered at 36 weeks gestation and continued throughout 1 week after delivery (arm A); ZDV and 3TC intrapartum and throughout 1 week after delivery (arm B); ZDV and 3TC intrapartum only (arm C); or placebo. While both neonatal HIV transmission rates and mortality were significantly reduced after 6 weeks of life in arm A and arm B compared with placebo, no significant difference in any of the study arms was seen after 18 months. During the follow-up period, most of the participants were breast-feeding, which the researchers believe accounts for the high number of HIV infections. Thus, it is becoming increasingly clear that a combination of all of the best practices described above (safer delivery procedures, including planned Caesarian section, anti-HIV drug treatment, and replacement feeding) are needed to significantly reduce mother-to-child transmission of HIV – by up to 90%.

As a result of all of these findings, it is universally recommended that all pregnant women should be counselled about HIV early in pregnancy and encouraged to be tested for HIV infection as a routine part of standard antenatal care. HIV-positive females should be given anti-HIV therapy to reduce *in utero* and perinatal HIV transmission. ZDV is still relatively expensive, but nevirapine is less than \$US 4.00 a dose, so the prospects of preventing mother-to-infant transmission of HIV may be less expensive in the new millennium. However, studies to confirm the effectiveness and safety of nevirapine are, as of mid-2000, still in progress.

## Prevention of mother-to-child transmission of HIV in the Asia Pacific region

The problem of paediatric AIDS and maternal AIDS orphans in the Asia Pacific region is diverse and difficult. The estimated number of paediatric AIDS cases and maternal AIDS orphans are directly related to the number of HIV-infected females of child-bearing age and their fertility rates. In addition, the number of HIV-infected mothers who breast-feed their infants will also affect the number of mother-to-child HIV transmissions.

HIV prevalence is very low in most Asia Pacific countries and the predominant HIV-risk-behaviour populations are injecting drug users (IDU), who are predominantly male, and sex workers and their male clients. A relatively small "core" group of highly exposed female sex workers (FSW) can develop very high HIV infection rates and transmit infection to their more numerous male clients. This accounts for the very large male preponderance of HIV infections in the early phase of a heterosexual HIV epidemic in Asian countries. In the latter phases of a heterosexual HIV epidemic, the male to female ratio begins to decrease as infected males begin to infect their steady female sex partners (i.e., their wives or girlfriends). The male to female ratio of HIV infections in most Asian countries is generally from 5:1 to 3:1 in favour of males. These factors (generally low HIV prevalence, a much higher male to female ratio of HIV infection), plus a much lower fertility rate in Asia compared with sub-Saharan Africa, account for the relatively small numbers and prevalence of mother-to-child transmission of HIV in Asia compared with Africa.

In the few high HIV prevalence countries in Asia (Myanmar, Thailand, Cambodia, and several states in India), however, up to 5-10% of antenatal females in some areas have been infected with HIV. In contrast, in most other Asian countries, estimated HIV prevalence in antenatal females is generally about one infection per several thousand women. The development of routine HIV testing and counselling programmes for antenatal females in Asia is confronted with this very wide range in HIV prevalence between different Asian countries. Without massive additional external support, Asian countries with current high HIV prevalence generally do not have the resources or sufficiently developed medical or public health infrastructures to mount routine national HIV testing, counselling, and treatment programmes for the prevention of mother-to-child HIV transmission. Thailand is the current possible exception, but even Thailand is having difficulties in marshalling all the needed resources and support for such a national programme. Even if such a national programme were started in Thailand, two additional and difficult HIV problems also need to be addressed at the outset. Will anti-HIV treatment be made available to the mother and the father of the child, and what replacement feeding, if any, will be provided to the child?

In low HIV prevalence Asian countries/city states that are more economically developed (i.e., Hong Kong, Japan, Macao, the Republic of Korea and Singapore) a difficult programme decision needs to be made. They need to decide whether HIV testing and counselling will be routinely offered to all pregnant females, even when estimated HIV prevalence may be just one infection per several thousand women tested. Such a policy decision was made in Hong Kong and a comprehensive programme for routine offering of HIV testing for all antenatal females, as well as provision of the most up-to-date drugs and other recommendations for the prevention of mother-to-infant transmission of HIV, was started in 2001.

With the possible exception of the few high HIV prevalence countries in Asia, current and projected numbers of paediatric AIDS cases and maternal AIDS orphans in Asia are relatively low and are expected to remain so. However, regardless of what the actual numbers may be, the problem of mother-to-child transmission of HIV will continue to be a vexing challenge to public health, health care and social support systems throughout Asia.

## Annex 3

## The reproductive number ( $R_0$ ) of HIV infections

The past, present and future prevalence of HIV infection can be understood more clearly by utilizing the concept of the reproductive number of an infectious disease agent—designated  **$R_0$** . This relatively simple epidemiological concept describes, in a single value, the epidemic potential of an infectious agent. When, on average, one infected person infects more than one other person,  **$R_0$**  is greater than 1 and the result will be sustained or epidemic spread of the agent. However, when, on average, one infected person does not infect more than one other person,  **$R_0$**  is either 1 or  $<1$  and epidemic spread does not occur. When  **$R_0$**  is 1 or  $<1$ , the infectious agent will either disappear or maintain itself in the population with zero or limited growth and become endemic.

Examples of the spread of an infectious agent where  **$R_0$**  is much greater than 1 are influenza and measles epidemics in a largely susceptible population. In such situations, one infected person at the start of an epidemic can easily infect scores of persons who in turn infect scores more, so that  **$R_0$**  is very high. Infected persons who recover are then immune to re-infection with the same infectious agent. As the epidemic continues, the number of persons who have been infected and have become immune increases, while the number of susceptible persons decreases. Thus,  **$R_0$**  in these examples decreases over time and eventually becomes less than 1, and the infectious agent either becomes endemic or dies out, depending on how rapidly new susceptible persons become available. The epidemiological dynamics of HIV infection are different because not everyone is at equal risk of HIV infection, and extensive transmission of HIV requires specific patterns and networks of persons engaged in HIV-risk behaviour(s).

The average  **$R_0$**  of HIV via sexual transmission in a specific time period is dependent on:

- the risk of a sex contact being HIV positive (i.e., the prevalence of HIV in a sex network);
- the efficiency of HIV transmission per coital act;
- the number of different sex partners in a specific time period; and
- the number of unprotected coital acts with each of the above sex partner(s) in a specific time period.

Because the efficiency of HIV transmission per coital act is low, the  **$R_0$**  of HIV cannot be greater than 1 unless the number and frequency of sex partner exchange is very high. In populations (sex networks) where HIV prevalence is very low, a very high risk pattern and a very high prevalence of heterosexual risk behaviours can be present without the  **$R_0$**  of HIV being greater than 1. However, if HIV prevalence is allowed to rise to a “high” level (arbitrarily up to 1%), then, depending on the underlying pattern(s) and prevalence of sex partner exchange rates,  **$R_0$**  of HIV may increase to be greater than 1 – and if HIV prevalence is permitted to rise to 5%, it will make “self-sustained” transmission of HIV ( **$R_0$**  more than 1) that much easier to reach for a given level of HIV-risk behaviour.

With regard to HIV transmission, **Ro** among participants who engaged in sex partner exchange activities in gay bathhouses and among injecting drug users in “shooting galleries” during the early 1980s was probably of the order of 5-6. **Ro** for HIV in male haemophilia patients (also for most other adults who received HIV-infected blood or blood products) and their steady sex partners has been substantially below 1. **Ro** for FSW and their male clients can be either  $<1$  or  $>1$ , and its value depends on sex partner exchange rates and the presence or absence of many facilitating or inhibitory factors.

The concept of **Ro** and HIV transmission in different HIV RBG whose prevalence of HIV-risk behaviour differs can be illustrated by reviewing HIV trends in Thailand from 1989 to 1999. The Thai HIV sentinel surveillance data show very clearly that extensive HIV transmission was essentially limited to the highest HIV RBG and to some of their regular sex partners. After explosive increases in HIV prevalence among IDU and FSW groups during the late 1980s and early 1990s, some limited transmission from infected male clients of FSW and HIV-infected male IDU to some of their regular sex partners occurred. However, since the mid-1990s, HIV prevalence levels among antenatal females in Thailand have been slowly decreasing – from over 2% in 1994-1995 to 1.5% in 1998. This decrease cannot be totally attributed to the 100% condom programme that was implemented among FSW and their clients, because no marked increase in condom use with their wives and steady girlfriends has been documented among Thai males. At least part of this decrease is more likely due to the fact that **Ro** between HIV infected Thai males and their steady sex partners is less than 1.

## Annex 4

## Major determinants of heterosexual HIV transmission

In about two-thirds of all countries in the world, HIV prevalence attributable to heterosexual transmission is less than one infection for every thousand adolescents and adults 15-49 years of age. However, in almost all countries in sub-Saharan Africa, several countries in the Caribbean region, and a few countries in south and southeast Asia, HIV prevalence in heterosexual populations ranges from lows of about 1-2% to over 35%. How can such large differences in HIV prevalence attributable to heterosexual transmission between countries with high HIV prevalence (1% or greater) and most other countries be explained? Answers may be found by examining the pattern(s) and prevalence of sex partner exchange rates and the relative inefficiency of HIV transmission via unprotected sexual intercourse. From the beginning of the HIV/AIDS pandemic, the low infection rate of HIV per any single act of sexual intercourse (anal or vaginal) and the paramount importance of quantitative and qualitative parameters of HIV-risk behaviours have not been fully appreciated by most policy-makers, and many epidemiologists.

It is generally accepted that other STI, especially those that cause ulcerative lesions, such as chancroid and syphilis, increase the efficiency of HIV transmission. It is clear from many epidemiological studies that if an individual has an ulcerative genital lesion, the risk of HIV transmission is increased. However, no internationally accepted measures or indices have been developed to reliably quantify the prevalence of STI between different countries. STI prevalence surveys are difficult to conduct and data are limited to small, selected

**Table 5:** Estimated regional HIV and STD prevalence, end of 1999

Region	Adults 15-49 (Millions)	No. HIV (Millions)	HIV Rate (%)	No. STI (Millions)	STI Rate (%)	Index STI Index
Sub-Saharan Africa	273.53	23.40	8.56	69	25.23	11.52
Caribb & Latin Amer	269.13	1.55	0.58	38	14.12	6.45
South & SE Asia	993.47	5.40	0.54	151	15.20	6.94
"Western" countries	359.44	1.43	0.40	32	8.90	4.06
E Eur & Central Asia	197.72	0.41	0.21	22	11.13	5.08
N Africa & Mid-East	171.94	0.21	0.12	10	5.82	2.66
East Asia & Pacific	821.65	0.53	0.06	18	2.19	1.00*
<b>Total</b>	<b>3086.88</b>	<b>32.93</b>	<b>1.07</b>	<b>340</b>	<b>11.01</b>	

\*This region had the lowest STD rate, and all of the other regions are multiples of this lowest rate – i.e., the STD rate in sub-Saharan Africa is 11.52 times greater than the STD rate in the East Asia and Pacific region.

\*\*The Spearman rank difference correlation between HIV prevalence in 2000 and STD Index in 1998 for these 7 regions is: + 0.93. The standard error for this correlation is 0.02.

samples, mostly from STD clinics. These limited data suggest that the prevalence of STI, especially those associated with ulcerative lesions, is higher in populations with high heterosexual HIV prevalence than in countries with low heterosexual HIV prevalence.

Table 5 presents regional estimates of HIV prevalence, as of the end of 1999, together with a regional STD index, calculated from estimates of regional STD prevalence made in 1998 <sup>9</sup>. This table shows a good correlation with HIV prevalence and a calculated STD index. The East Asia and Pacific region has the lowest STD prevalence rate and the lowest STD index, as well as the lowest estimated HIV prevalence rate, whereas sub-Saharan Africa has the highest STD prevalence rate, highest STD index and highest estimated HIV prevalence rate. The combination of the Caribbean and Latin America may partly obscure the probably higher STD rates in the Caribbean.



# Annex 5

## Understanding HIV/AIDS numbers

This section defines and describes the HIV/AIDS numbers commonly used by HIV/AIDS programmes in order to clarify potential misunderstanding, especially for those health care workers and others who may not be familiar with the specific meaning of these numbers.

The first cases of HIV infection or AIDS were imported into the Asia Pacific region in the early to mid-1980s. At the beginning of public health surveillance for HIV/AIDS in Asia Pacific countries, no distinction was made between prevalent and cumulative numbers of HIV infection and/or AIDS. However, with time and the progression of HIV infection to AIDS and death, the constant widening difference between the prevalent number of HIV infection and the cumulative number became very obvious. As of the beginning of the new millennium, cumulative numbers of HIV infection and/or AIDS cases are not commonly used, except to put HIV/AIDS epidemics in this region into a historical perspective. Public health programmes now almost exclusively use prevalent (those persons living with HIV at a specific point in time) and incident (new HIV infections over a specified time period – usually a calendar year) numbers.

Since HIV is primarily a sexually transmitted infection, the prevalence of HIV is most frequently presented for the most sexually active age group (15-49 years), and not for the total population. The prevalence of HIV can be a number or rate (expressed as a percentage of a specified population) of persons alive with an HIV infection. Thus, if there are 2000 HIV infections in a population of 10 000 15-49 year-olds, the prevalence of HIV in this 15-49 year-old population is 2000 or 20% (2000 divided by 10 000). If there are 500 HIV infections in persons outside of the 15-49 year-old age group and there are 15 000 persons in these other age groups, the HIV prevalence for the total population would be 2500 or 10% (2500 divided by 25 000). The latter HIV prevalence rate is rarely presented but, when it is, this may be confusing to the public, who usually see the prevalence rate for the 15-49 year-old population as 20%. Similarly, annual HIV incidence or incidence rates are usually presented only for the 15-49 year-old population. When presenting data for paediatric AIDS or for maternal AIDS orphans, the age grouping is from 1 to 15 years.

A clear distinction also needs to be made for each of the following types of HIV/AIDS numbers – reported, official, estimated and actual. As described in the section on public health surveillance, the completeness and reliability of reported numbers of HIV infection and/or AIDS cases varies markedly from country to country and within any country there may be marked temporal variation in the accuracy of reported HIV/AIDS. Official numbers of HIV/AIDS may be reported cases or in some instances may be officially estimated cases. Estimated numbers may be derived by a government-appointed expert group or can be the estimated number of an individual or an



agency. Some care needs to be taken in evaluating estimated numbers since, depending on the data, assumptions and method(s) used to derive the estimate, the resultant figure can represent a reliable working estimate of the actual HIV/AIDS numbers or may represent gross overestimation or underestimation of these numbers. The actual or real numbers represent the “Holy Grail” for public health epidemiologists. The best approximation of the actual numbers can be derived via an objective estimation process, using the best data available and reasonable assumptions and methods for the estimation process.

In general, HIV prevalence is usually derived or extrapolated from available HIV seroprevalence data and most of the other HIV/AIDS numbers, including projections or forecasts of HIV/AIDS numbers are derived from scenario/modelling.

# Annex 6

## Public health surveillance of HIV/AIDS

Public health surveillance can be defined as the collection, analysis and dissemination of data relevant to the prevention or control of a public health problem. The general methods used for public health surveillance of HIV infections and AIDS cases are, in general, no different from those used for other diseases and infections. However, the methods used must be adapted to the unique epidemiology, wide variation in prevalence levels, and the very long incubation period of HIV infection prior to the development of AIDS. In addition, the severity of AIDS and the extreme social and personal implications of identifying HIV-infected persons make surveillance of HIV/AIDS much more difficult and make issues such as anonymity and confidentiality of paramount importance. Confidentiality of personal data is a universally accepted concept, but anonymity in the public health management of any infectious or communicable disease is a new and difficult concept to accept, especially in most countries in Asia.

### Case reporting

Recognition, diagnosis and reporting of HIV/AIDS is generally very incomplete, so HIV infections and AIDS cases reported to health authorities throughout the world constitute a variable and, usually, only a small fraction of the estimated total (i.e., "the tip of the iceberg"), especially in developing countries. Within Asia Pacific countries/city states, the estimated completeness of AIDS case reporting varies from highs of 50% or more in places such as Hong Kong, to less than 5% in other Asia Pacific countries. Reporting of HIV infections is usually much more incomplete and inaccurate than AIDS case reporting, even in those countries where HIV reporting is required. Therefore reported AIDS cases and HIV infections should serve only as a starting point for estimation of actual HIV infections and AIDS cases that have occurred.

### HIV sentinel surveillance

Guidelines for Sentinel Surveillance of HIV (HSS) were initially developed by WHO in the late 1980s. These broad guidelines were developed primarily for countries in sub-Saharan Africa, where extensive heterosexual transmission was occurring. The patterns and prevalence of HIV in most Asia Pacific countries are quite different from those observed in Africa. Thus, according to the UNAIDS/WHO Guidelines for Second Generation HIV Surveillance, distributed in 2000, the WHO HSS Guidelines must be adapted to different HIV patterns and prevalence rates in Asia Pacific countries.

Epidemiological data on HIV infections, collected since the mid-1980s, make it clear that multiple and, to a great extent, separate epidemics of HIV infection can occur in any country or region, depending on the distribution and prevalence of specific HIV-risk behaviours, including MSM, IDU who routinely share injecting equipment, and heterosexuals who have unprotected sex with multiple sex partners (HET). HIV surveillance systems need to be designed to monitor each of these relatively separate HIV epidemics.

HIV infections are not randomly distributed in any large population. The public health surveillance strategy developed by WHO relied on the routine and consistent collection of data from sentinel groups who could be considered representative of their group's risk of acquiring HIV infection. The basic purpose of HSS is to detect changes (i.e., trends) in HIV prevalence in the sentinel groups selected. If various sentinel groups can be monitored consistently over time at selected sites, the data collected should provide reliable data on HIV trends in these groups. These data should be sufficient for the design and direction of HIV/AIDS prevention and control programmes. The sentinel populations selected should, to the extent possible, include all major HIV-risk behaviours or factors known to be prevalent in any given population and/or area.

HSS was not designed to collect data for the development of national HIV seroprevalence estimates. However, HSS data have been used for this purpose simply because there were no other HIV seroprevalence data sets available that might have been any better for this purpose. In addition alternative methods, such as community-based surveys are costly and difficult to carry out on a routine basis and may also not be reliable.

#### Problems and limitations of HSS sentinel groups in Asia Pacific countries

Population groups considered to be at high risk of HIV infection because of their behaviour and selected as sentinel groups for HSS include MSM, IDU and HET subgroups – FSW and sexually transmitted infection (STI) patients. Lower-risk HET subgroups used in HSS systems have included blood donors, military recruits and antenatal clinic attendees (ANC). In addition, tuberculosis patients have been included in some HSS systems. Uniform definitions for each sentinel group and rules for consistency in using them are essential for the collection of reliable HSS data.

#### *FSW*

Studies in Thailand indicate that there are many different types of FSW in the country –from the direct brothel worker to the occasional freelancer who may be picked up at bars or other locations. In general, the average HIV risk for each type of FSW varies directly with the average number of different sex partners each type may have on a daily or weekly basis. Estimates of each type of FSW in any given area are usually not made and different sentinel sites may target different types of FSW.

#### *IDU*

Similarly, not all drug users inject drugs, and not all injecting drug users routinely share their injecting equipment. The heterogeneity of HIV risk within these sentinel groups must be recognized. Detailed guidelines should be provided to sentinel sites so that all sites are collecting data from similar types of IDU subgroups. In addition, the relative size of each specific IDU subgroup must be estimated when HIV prevalence is estimated for the total IDU population.

#### *Blood donors*

Blood donors in most developed countries with a totally voluntary blood-donor system are considered a low HIV-risk group. However, in many Asia Pacific countries, depending on the utilization of paid donors, this population group may include persons with some increased risk of HIV infection. In addition, HIV prevalence among blood donors should decrease markedly when appropriate methods are implemented prior to blood collection to screen out donors with possible high HIV-risk behaviours.

#### *Military recruits*

Young males who are drafted or volunteer for military service may in some countries be considered relatively representative of other males who do not enter military service. However, once in the military, these young men may increase their general patronage of FSW and thereby increase their overall risk of acquiring an HIV infection.

#### *Antenatal females*

Pregnant females are an easily identified group from whom blood specimens can be collected routinely to monitor HIV prevalence. In sub-Saharan African countries, where the predominant mode of HIV transmission is heterosexual, HIV prevalence rates in antenatal females have been used as a surrogate for HIV prevalence in the most sexually active (15-49 years of age) male and female population. Some

limited community-based HIV serological surveys of males and females in sub-Saharan African countries suggest that HIV prevalence found in antenatal females is a reasonable surrogate for HIV prevalence in the sexually active population. HIV prevalence was found to be much higher in young antenatal girls than in other young girls and boys, while it was found to be much lower for pregnant women aged 25-39 compared with non-pregnant females in the same age group. However, the average HIV prevalence in antenatal females was close to the average HIV prevalence in males and females from the same general area.

Whether antenatal females in Asia Pacific countries can be used as reasonable surrogates for HIV prevalence in both males and females in their communities remains an unanswered question as of 2001. In addition, questions as to how representative antenatal females may be of the general female population have been raised. Females who become pregnant may differ from females who don't become pregnant because of factors that may be related to HIV infection. HIV infection may reduce fertility progressively over time and HIV is often associated with other STI known to cause infertility.

### *Tuberculosis patients*

Tuberculosis patients have been included as sentinel groups in many HSS systems, but data from these patients are difficult to interpret without a full understanding of the dynamic temporal interrelationship between *Mycobacterium tuberculosis* (*Mtb*) infection and HIV infection. Models of the interaction between HIV and *Mtb* infections provide useful estimates and projections of the additional tuberculosis cases that may be expected annually in populations with different prevalence levels for these infections. In sub-Saharan Africa, where adult HIV prevalence levels are as high as 10-20% and the *Mtb* prevalence may exceed 50%, the annual number of adult tuberculosis cases can be expected to increase by up to 10-fold during the new millennium. Although the prevalence of *Mtb* infection among young and middle-aged adults in most Asia Pacific countries is relatively high (from 25% to over 40%), adult HIV prevalence levels are much lower and range from less than 0.1% to over 2%. In Thailand, where adult HIV prevalence was estimated in 1995 to be over 2% and where the adult prevalence of *Mtb* infection is about 35%, annual tuberculosis cases were projected to double by 2000. In Hong Kong, where adult HIV prevalence in 1995 was estimated to be less than 0.1% and prevalence of *Mtb* in adults was about 30%, the annual increase in tuberculosis cases by 2000 was projected to be no more than about 2-3%.

### Sampling Issues

The sampling method for HIV sentinel groups can best be described as a practical "grab" sample. Most programmes have not provided detailed guidelines to local or provincial health staff about how to select each annual or semi-annual sample. In populations where there are large numbers of FSW, IDU and male STI patients, it may not be difficult to obtain sufficient numbers of these risk groups in a short time period. However, in smaller populations, it may be very difficult, if not impossible, to collect the requested number, even if the time for collection is extended and multiple sites are used.

Local sentinel sites may sometimes be changed from one HSS round to another, and occasionally even during the course of one HSS collection period. This raises the question of how to interpret differences in HIV prevalence from one HSS round to another. Are the differences due to real changes in HIV incidence over time in a given geographic location, or are differences related to variations in HIV prevalence in the sentinel group sampled? One of the major assumptions made in the interpretation of HSS results is that, if sample collections are consistently uniform (i.e., same local sites, same sampling frame/method, etc.), then differences in HIV prevalence from one HSS round to another might be attributed to HIV incidence in the sentinel group. However, when HIV prevalence is relatively low (i.e., well below 1%), very wide fluctuations – as much as several-fold – may be found in any specific sentinel group. Thus, calculation of annual HIV incidence by subtracting last year's estimated prevalence from the current year's estimated prevalence can result in either a positive or negative annual incidence of HIV infection.

It must be stressed that HSS samples do not comprise a selected cohort (i.e., the same persons) who are sampled over time, but rather a series of cross-sectional samples of a target population. Additional potential biases in HSS data include possible different proportions of urban versus rural samples collected from one round to another, and marked differences in the average age of those selected from one round to another.

## Behavioural surveillance

During the early 1990s, at the behest of international donors, increasing attention was given by WHO to the development of evaluation indices for HIV/AIDS programmes. However, methods for routine behavioural surveillance that should be implemented by HIV/AIDS programmes were not developed by any major international agency. The general concept of behavioural surveillance was not formulated until 1993 and behavioural surveillance targeting selected risk groups has not, as of the late 1990s, been systematically and routinely implemented in most national HIV/AIDS programmes. Relatively large-scale population surveys of HIV-risk behaviours (KABP surveys) have been developed and supported by WHO, but they did not support the development of periodic cross-sectional behavioural surveys of HIV-risk behaviour groups.

It is now acknowledged that a significant amount of formative research may have to be undertaken before an efficient behavioural surveillance system can even be set up. This research, which aims to identify major HIV-risk behaviour subpopulations or groups to develop appropriate behavioural questionnaires, and to construct sampling frames through which surveys might be administered, is being developed by WHO and Family Health International (FHI). In addition, UNAIDS and WHO are currently in the process of updating the guide and methods package for monitoring and evaluating HIV and AIDS prevention and care programmes. This joint guide will include revised indicators and updated data collection instruments. The choice of behavioural indicators may vary slightly according to the group surveyed, but they will generally include:

- **PI4** - Percentage of respondents who report at least one non-regular sex partner in the last 12 months; and
- **PI5** - Percentage who say they used a condom the last time they had sex with a non-regular partner, of those who have had sex with a non-regular partner in the last 12 months.

In addition, the following indicators may be considered in specific populations:

- **Youth**: age at first sex;
- **Drug injectors**: Reported sharing of unclean injecting equipment;
- **Sex workers**: Reported number of clients in last week;
- **Sex workers**: Reported condom use with last client.

Whether all national AIDS programmes in Asia need such detailed behavioural research studies or all of the behavioural indicators listed above is open to question. A more accurate surrogate measurement of P14 and P15 may be the prevalence of genital herpes (HSV<sub>2</sub>) antibodies in young (20-24 years of age) antenatal females. Described below are what may be the basic and essential behavioural data needed by all AIDS prevention/control programmes in Asia.

The essential HIV-risk behaviour surveillance data needed by AIDS prevention and control programmes in all Asian-Pacific countries include:



- the patterns and prevalence of the highest-risk sexual behaviours; and
- the patterns and prevalence of sharing injecting equipment among injecting drug users.

There is a critical need to develop routine surveillance of these HIV-risk behaviours. If public health programmes are to be effective in reducing or at least modifying these behaviours, they must first obtain reliable baseline data on sexual and injecting drug behaviours in population groups who are known to practice these behaviours. The essential data needed for all high HIV-risk groups include:

- On average, how many different sexual partners did persons in this group have during the past month and/or week?
- For each of these sexual encounters, was a condom used?

Tabulation and analysis of the answers to these questions yields basic information that can provide programmes with:

- specific and reasonable targets that can be achieved over a specified period of time; and
- specific means of evaluating the effectiveness of programme interventions with regard to stated targets.

For example, if the targeted population were truck drivers, and the baseline behavioural surveillance survey indicated that this group had an average of 3.5 different sex partners per month, with condom usage about 20%, then the programme could initially set programme targets:

- to reduce the average number of sex contacts in this group to two per month or less; and
- to increase condom use to 50% over the next six months or a year.

Such programme objectives should be pursued regardless of whether HIV seroprevalence in the community is very low, moderate or high. A second behavioural survey six months or a year later can be used to measure whether or not programme targets have been achieved, or if any changes have occurred.

Routine sexual behavioural surveillance surveys (not research studies or large KABP surveys) should be carried out on a regular basis for all identified high HIV-risk behaviour groups. For those persons who engage in injecting drug use, the essential behavioural questions they need to be asked in addition to the two basic sexual behavioural questions are:

- With how many persons and how often, do you share drug injecting equipment during the past month and/or week?
- Do you use separate and/or clean injecting equipment when you share injection equipment?

The answers to these behavioural questions will provide public health programmes with data to develop targets for changing these behaviours and to evaluate the effectiveness of education and other interventions in achieving these targets. Public health epidemiologists, in collaboration with behavioural scientists and experts, will need to develop and evaluate instruments (questionnaires, etc.) and methods for the routine collection of behavioural surveillance data for specific populations.

*Annex 7*

## Methods for estimation/projection of HIV infection and AIDS cases/deaths

The following section describes the limitations of the general methods used for estimating all the important and needed HIV/AIDS numbers including:

prevalence, incidence and cumulative incidence of HIV infections;

prevalence, incidence and cumulative incidence of AIDS cases and AIDS deaths; and

prevalence, incidence and cumulative incidence of HIV-related diseases or conditions such as paediatric AIDS and maternal AIDS orphans and HIV-related tuberculosis cases.

### Methods for estimating HIV prevalence

- (1) Prior to the advent of effective drug therapy to delay or prevent the relentless progression from HIV infection to the development of AIDS, most developed countries considered reported AIDS cases to be sufficiently reliable for estimating HIV prevalence by using [a back-calculation method](#). The back-calculation method used annual progression rates from HIV infection to AIDS and reported annual AIDS cases (usually after adjustments for incomplete and delayed reports) to calculate how many annual HIV infections would have been needed to generate the estimated annual AIDS cases.
- (2) A ["ratio" method](#) that used an estimated ratio of prevalent HIV infections to prevalent AIDS cases was used in the late 1980s and early 1990s to estimate HIV prevalence. Like the back-calculation method, the ratio method required reliable estimates of AIDS cases, which were generally not available. In addition, most users of the ratio method did not realize that in all HIV epidemics the ratio of prevalent HIV infection to prevalent AIDS cases changes rapidly over time. This HIV/AIDS ratio falls from many thousands to one during the first few years of an HIV epidemic, to less than ten to one after the first decade. This decline occurs whether HIV incidence is increasing or decreasing because, in the absence of effective treatment, virtually all HIV-infected individuals progress to AIDS. Thus, at the start of any HIV epidemic, there are virtually no AIDS cases in the first few years so that the HIV to AIDS case ratio is almost all HIV and no or few AIDS cases. As the HIV epidemic continues, almost all HIV infections will progress to AIDS and the HIV to AIDS case ratio will gradually decrease. In a hypothetical situation, where all HIV transmission is stopped, the HIV to AIDS case ratio will decrease to almost 1:1 because virtually all HIV infections eventually progress to AIDS.

- (3) A simple and useful method to estimate current HIV prevalence in a “mature” HIV epidemic (one that has been in progress for about 10 years or longer) is to **multiply the estimated annual AIDS cases by 20**. If the median period for HIV infection to the development of AIDS is assumed to be 10 years, then about 10 years after the start of an HIV epidemic, about 5% of prevalent HIV infections will develop AIDS on an annual basis. For example, if the estimated annual number of AIDS cases is 5000, then the estimated HIV prevalence would be about 100 000 (5000 multiplied by 20). Conversely, if HIV prevalence is estimated to be 100 000, then by taking 5% of the HIV prevalence one can rapidly calculate the expected annual number of AIDS cases to be about 5000. This is a “quick check and balance” method to see if the national estimate of HIV prevalence is compatible with the estimated annual number of AIDS cases or the reverse – if the estimated annual number of AIDS cases “fits” with the estimated national HIV prevalence.
- (4) In the absence of reliable AIDS case estimates or data, epidemiologists have estimated HIV prevalence by **using the results of serological surveys** and extrapolating these data to the total 15-49 year-old population. This has been and continues to be the primary method used in developing countries to estimate HIV prevalence. Major problems with this method are the limited number of HIV seroprevalence studies that may be representative of specific populations or subgroups, and the wide variability in estimates of the size(s) of important HIV-risk behaviour groups or cohorts, such as FSW, IDU and patients seen in STI clinics. Nevertheless, epidemiologists have derived reasonable working estimates of the prevalence, general distribution and trends of HIV infection for many countries by an objective and detailed analysis of all HIV serosurvey data and demographic data on general population distribution.

#### Estimation of HIV prevalence by using HIV serological data

As of 2001, no uniform process and/or methods have been developed and distributed by UNAIDS or WHO to national AIDS programmes for their estimation of HIV prevalence using available, but often limited HIV serological data. As a result, many epidemiologists have developed their own methods, assumptions and biases for using the available HIV serological data to derive a seroprevalence estimate. Although HIV sentinel surveillance (HSS) systems were not designed to provide data for making HIV prevalence estimates, they have been widely used for this purpose, simply because there are usually no better serological data available. HIV/AIDS programmes have routinely used HSS data to estimate HIV prevalence in the major sentinel groups. HIV prevalence in the 15-49 year-old population has been calculated according to the following general formulae:

- (1) The number of HIV infections in each of the major high-risk groups = estimated HIV seroprevalence rate (from HSS data) multiplied by the estimated number of the high-risk group (estimated for a specific population or a province); and
- (2) The number of HIV infections in the 15-49 year-old population = estimated HIV seroprevalence rate in antenatal women in the province (from HSS data) multiplied by the estimated number of 15-49 year-olds in the province (from census estimates).

#### Major Sources of Potential Error when Using this General Method :

- (a) The data quality and representativeness of the usual grab samples collected for most HSS systems can be seriously questioned. However, there have not been any systematic attempts to quantify the probable range of error(s) related to such data quality issues.
- (b) Errors in estimating the size(s) of specific RBG can be quite large (up to several times higher or lower).



- (c) The probable heterogeneity of HIV risk within any specific RBG is well known, but frequently findings from sentinel HIV sites that tend to capture persons from those RBG with the highest or very high-risk behaviours are then extrapolated to the total RBG. This obviously will tend to lead to higher HIV prevalence estimates.
- (d) A major assumption used in this method is that HIV prevalence found in antenatal clinic attendees (ANC) can, with adjustment for the estimated male to female (M:F) ratio, be used as a surrogate for HIV prevalence in the total 15-49 year-old population. This assumption, used in sub-Saharan Africa, is supported by limited community-based HIV serosurveys, which suggest that HIV seroprevalence among antenatal females is a reasonable surrogate value for HIV seroprevalence in the total 15-49 year-old population in sub-Saharan Africa. However, this assumption has not been validated for other populations.
- (e) Measurement and/or estimation of the male to female (M:F) ratio of HIV infections has been carried out using a variety of methods and assumptions. In most epidemiological settings outside Africa (where there is a slight excess of infected females, compared to males) there has been a consistent and fairly large preponderance of infected males compared with females. However, many Asian countries do not factor in a M:F ratio in their process of estimating their national HIV seroprevalence and this could result in a gross underestimation if ANC data are used without any adjustment to estimate HIV prevalence in both males and females. All HIV prevalence estimation processes should try to ensure that the overall HIV prevalence estimate is consistent with the estimated M:F ratio.
- (f) In heterosexual HIV epidemics in Africa, a marked urban-to-rural HIV differential, of up to 10-fold or more, was noted in the early phase of HIV spread. This differential narrowed markedly with time and after 10 years or more had been reduced to about 1-2-fold. One current assumption is that changes in the urban-to-rural HIV prevalence differentials in other developing country populations follow the same general course as that which has been observed in Africa. It is quite possible (and indeed probable) that, in other regions, heterosexual transmission of HIV may remain more localized in the highest RBG in urban centres and may penetrate or diffuse much more slowly (if at all) into most rural populations. However, in the absence of any substantive HIV prevalence data collected from truly rural populations, the assumption that there is no urban-to-rural prevalence differential for HIV seroprevalence in Asian populations, can result in very large and unsupported HIV prevalence estimates.

## Methods for Projecting HIV

There is an ancient Arabic saying – *those who predict the future, lie, even if they think they are telling the truth*. This saying succinctly sums up the great uncertainty in projecting the future, especially for a complex problem such as HIV transmission. Nevertheless, attempts to predict future trends and prevalence of HIV have been carried out with a very wide range of errors, using the following methods.

- The [Delphi survey method](#) was developed in an attempt to improve the reliability of the judgments needed in relatively uncertain situations, as well as to provide a means of quantifying such judgments. Essentially, the Delphi method obtains educated guesses from selected experts in a reiterative fashion, and then uses the average and range of the Delphi responses as projections. Major advantages of the Delphi method are speed and low cost. However, it is difficult to select truly knowledgeable experts (i.e., experienced quantitative epidemiologists who are familiar with the epidemiology of HIV and general demographics of a specific country or population) to develop reliable estimates or projections of the number of HIV infections. Furthermore, estimates and projections made by the Delphi method may have extremely wide ranges. This method should be used only for populations where no data are available.

- [Mathematical and computer/simulation models](#) have been used to develop short and long-range projections of HIV prevalence. However, such models should be used primarily for hypothesis testing - not for making estimates and projections of the annual incidence/prevalence of HIV infection for a specific country or population(s). That was the conclusion of an UK expert committee that reviewed the situation in the UK in 1994. The committee concluded that the general uncertainty of many of the needed input parameters such as the size of the risk groups as well as reliable data on their current sex partner exchange rates, made estimation and projection of HIV/AIDS incidence and prevalence in the UK extremely uncertain. As a result, they stated clearly that model outputs should not be used for specific programme or policy development. However, many international "experts" and several international agencies have essentially ignored this sage advice and, as a result, some unrealistic HIV prevalence estimates and projections of HIV have been inappropriately used in some countries for programme and policy development.

## Method for short-term (less than 5 years) projection of AIDS cases/deaths

A simple [scenario/modelling](#) approach for estimation and projection of AIDS cases was developed during the late 1980s by the Surveillance, Forecasting, and Impact Assessment (SFI) unit of the former Global Programme on AIDS (GPA) of the World Health Organization (WHO). This scenario/modelling approach or method can be used to provide working estimates and short-term projections of AIDS cases and deaths for policy development and public health planning. A scenario is an outline for any series of events, real or imagined. HIV/AIDS scenarios can be made up or constructed with or without models to "fit" the observed HIV/AIDS data and trends. The following is an outline of the general methods used in this scenario/modelling approach to develop working estimates and projections of HIV infections and AIDS cases and deaths.

- (1) Assemble and analyse available HIV seroprevalence data to estimate the most recent pattern(s), prevalence and trends of HIV infection for a specific population.
- (2) Based on these data and other epidemiological observations, different HIV patterns and prevalence levels (i.e., scenarios) can be constructed with some confidence to the year 2005 for specific countries/populations.
- (1) An AIDS model can be used to derive annual and cumulative estimates and projection of AIDS cases/deaths and other HIV-related conditions, based on the general HIV scenario(s) constructed.

EPIMODEL is a simple microcomputer programme developed by WHO in the late 1980s to estimate past, current, and to make short-term projections of AIDS cases and deaths in areas where AIDS case reporting was largely incomplete and unreliable. EPIMODEL is still used widely for this specific task. Most problems encountered by users of EPIMODEL are associated with its misuse because, as a computer programme, EPIMODEL accurately calculates input parameters supplied by the user. Just as a calculator should not be held accountable for preparing an inaccurate tax return, EPIMODEL should not be blamed for inaccurate estimates of AIDS cases.

The basic module of EPIMODEL uses estimates of HIV prevalence and distributes this prevalence by annual HIV-infected cohorts back to the estimated start of the HIV epidemic along a selected epidemic curve. EPIMODEL then applies annual progression rates from HIV infection to the development of AIDS to each of the annual HIV cohorts to calculate annual numbers of adult AIDS cases and deaths. EPIMODEL provides default values for several input parameters that may be considered appropriate for modelling HIV/AIDS in a sub-Saharan African population, but all input parameters for EPIMODEL can be easily changed to better "fit" the specific population that is being modelled.

It must be recognized that, in any large population, the spread of HIV infection and the subsequent appearance of AIDS cases is usually the consequence of several epidemics, i.e., in different “risk groups” or different geographical areas. Each epidemic – whether it be among persons with multiple sex partners, injecting drug users, in urban or in rural areas – has its own starting point and intensity of spread (force of infection). Each HIV epidemic should be modelled separately if sufficient epidemiological data are available. It also needs to be emphasized that EPIMODEL, and/or any other method or model for estimation and projection of AIDS cases, cannot be considered precisely accurate. EPIMODEL uses *estimates* of HIV seroprevalence, *estimates* of the shape and age of the HIV epidemic curve, and *estimates* of average progression rates from infection to AIDS and death to derive its output. All of these *estimates* have to be constantly reviewed, and revised, as additional data become available.

EPIMODEL was not designed to provide projections of HIV infection. However, short-term projections of AIDS cases are not greatly affected by stopping or continuing HIV transmission after a specific year. This is because 80% to 90% of AIDS cases that will be occurring 3 to 5 years after a reference year will be in persons who were infected as of the reference year. However, major sources of potential error in this simple model must be constantly reviewed. Projections of AIDS cases for periods longer than 3 to 5 years can be produced by EPIMODEL by assuming that annual HIV infections beyond the reference year will continue along the curve selected for use. However, longer-term projections of AIDS cases using EPIMODEL, or any other model, are less reliable because they depend on accurate projection of future HIV infections.

The basic module of EPIMODEL was designed to estimate and project adult AIDS cases and deaths. This module can, with the additional input of a population denominator, calculate annual incidence and prevalence rates for HIV infection. Other modules of EPIMODEL include a CHILD module that estimates and projects annual numbers of HIV-infected and uninfected infants born to HIV-infected women. This paediatric module also calculates paediatric AIDS cases and deaths, and the age of maternal orphans during the year of their mothers’ death.

During the early 1990s, a TUBERCULOSIS module of EPIMODEL was developed to estimate annual numbers of tuberculosis cases related to HIV infections. EPIMODEL divides the estimated annual cohort of adult HIV infections into two separate groups – those with *Mycobacterium tuberculosis* (*Mtbc*) infection (*Mtbc*/HIV) and those without *Mtbc* infection. Each group is progressed to AIDS with rates that can be changed. Increased rates for the development of tuberculosis can be applied to the *Mtbc*/HIV group to estimate the increased number of tuberculosis cases as a result of HIV infection.

Aside from the potential errors described above, additional sources of potential error in using EPIMODEL include the following:

- (1) The greatest error could occur in estimating HIV point prevalence. This is not really an error of the model, but an extra word of caution in selecting input parameters for EPIMODEL. If a very high HIV seroprevalence estimate is used, the number of resultant estimated AIDS cases will also be very high.
- (2) The “stage” of the HIV epidemic will have a significant impact on the estimates of annual HIV incidence and on estimates of annual deaths due to severe immune deficiency related to HIV infection. For a specific point prevalence estimate of HIV prevalence, the estimated annual incidence of HIV infection will be greater in the early or increasing phase of an HIV epidemic than it will be in the later or declining phase of an HIV epidemic. The stage and duration of the modelled HIV epidemic will also have a major impact on the estimated cumulative incidence of HIV infections and AIDS deaths.



- (3) Another possible source of error in producing estimates and projections of AIDS cases and deaths with EPIMODEL is the selection of the median interval period from HIV infection to death due to severe immunodeficiency related to HIV infection. The median interval from HIV infection to the development of severe immune deficiency appears to be similar in all populations (i.e., in developed and developing countries) and is estimated to be about 7-8 years. However, there is a consensus that the survival period from the development of severe immune deficiency to death is much shorter in most developing countries than in developed countries, where the advent of HAART therapy has significantly increased survival of patients with moderate immune deficiency related to their HIV infection. A recent review of several cohort studies (Uganda, Thailand, and Haiti) indicate that the median interval from HIV infection to death is 9 years, and this median period will now be uniformly used to calculate annual HIV incidence and annual deaths due to immune deficiency related to HIV infection. There is a deliberate movement by UNAIDS/WHO to avoid estimation of AIDS cases because of the vagaries of AIDS definitions.

The default median progression period from infection to AIDS in EPIMODEL is 10 years and the default median interval from AIDS to death for developing countries is less than 1 year. This has resulted in a median interval from HIV infection to death of 11 years. The change from this 11-year median survival period to the 9-year median progression period from infection to death results in much higher (up to 30% higher) cumulative numbers of HIV infections. In addition, use of a 9-year median survival period results in a higher (up to 60% higher) annual number of AIDS deaths. This increase in annual deaths is needed to compensate for the increase in cumulative HIV infections.

# Annex 8

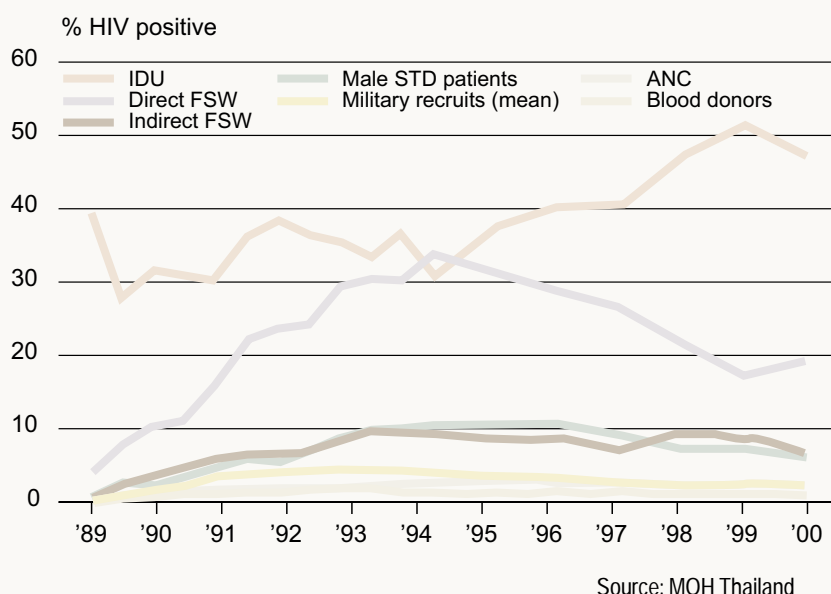
## HIV trends in some specific countries in Asia

The use of HIV Sentinel Surveillance (HSS) data to monitor HIV trends can be illustrated by reviewing HSS data from all the high HIV prevalence countries or areas in Asia (Thailand, Cambodia, Myanmar and Mumbai, India) and from a couple of low HIV prevalence countries (Indonesia and the Philippines).

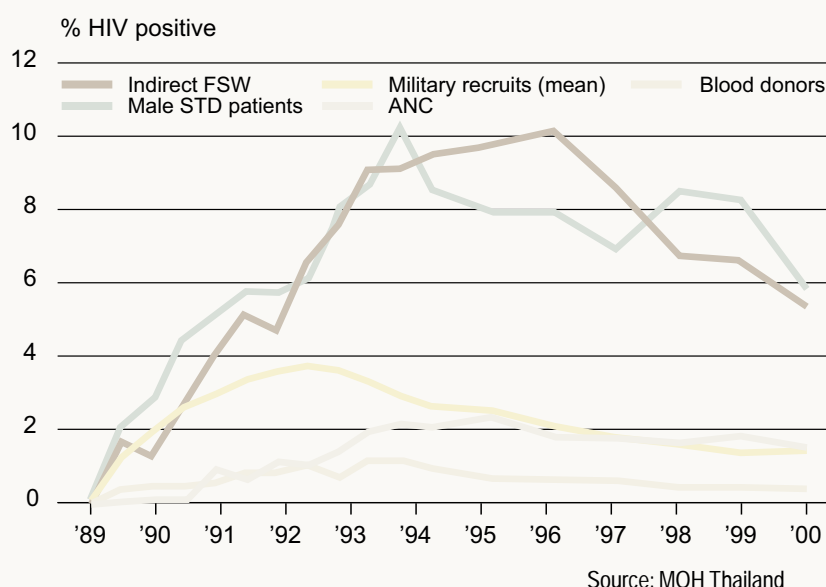
Figures 10 and 11 present findings from the Thai HSS system – from its beginning in 1989 up to and including the year 2000. The Thai HSS system was started in 1989 and was rapidly expanded to include all 76 provinces in the country. Until the end of 1994, two semi-annual rounds of HSS were carried out. Since then, a single annual round has been conducted mid-year. Sample sizes obtained for each of the sentinel groups from each sentinel site generally range from about 100-300. For each HSS round, a median value for each of the sentinel groups (except military recruits) has been plotted in Figures 10 and 11. For military recruits a mean value was used.

Very rapid and extensive HIV transmission occurred among IDU groups in Bangkok starting around 1986-1987. Figure 10 show that, by 1989, HIV prevalence had increased to about 30-40% among the IDU groups. That general prevalence was maintained throughout the mid-1990s and has been steadily increasing since then to reach over 50% in 1999 and close to 50% in 2000. At the start of HSS in Thailand in 1989, HIV prevalence in direct, brothel-type FSW was about 5%, increased steadily to peak around the mid-1990s at over 30% and appears to have been slowly decreasing since then. Figure 11 shows that HIV prevalence in all the lower HIV RBG (except blood donors and antenatal clinic (ANC) attendees) reached levels of a few percent by 1989 and all appeared to peak around the mid-

**Figure 10:**  
HIV sentinel  
surveillance, Thailand



**Figure 11:**  
HIV sentinel  
surveillance, Thailand



to-late 1990s. These HIV prevalence trends are clearly captured by the Thai HSS system, which is, by far, the most comprehensive HIV surveillance system developed by any country in the world.

The Thai HSS data show clearly that extensive HIV transmission has essentially been limited to their highest HIV RBG. After explosive increases in HIV prevalence among IDU groups and FSW and their male clients during the late 1980s and early 1990s, some limited transmission from infected male IDU and infected male clients of FSW to their wives and regular sex partners occurred. Since the mid-1990s, HIV prevalence levels among ANC attendees in Thailand has been slowly decreasing--from over 2% in 1994-1995 to about 1.5% in 2000. Not all of this decrease can be attributed to the 100% condom programme, implemented among FSW and their clients, because a marked increase in condom use has not occurred among Thai males with their regular sex partners. The slowly decreasing HIV prevalence in all of the lower-risk HIV sentinel groups is more likely due to a much lower frequency of sex partner exchange and lower frequency of sexual contact. As a result, the reproductive number of HIV in HIV-infected Thai males to their regular sex partners, and from infected females to other sex partners, is less than 1.

HIV infections were first detected in Cambodia through serological screening of blood donors in the early 1990s. However, the general magnitude of HIV transmission in the country was not fully described until the completion of the first HSS round in 1995. HIV sentinel groups that year included eight different populations in nine provinces located mainly on the Thai border, where HIV infections were suspected to be high. The results provided the first evidence of a highly disseminated HIV epidemic with prevalence of HIV up to 38% among FSW, 8% among police and the military, and about 2.5% among women attending ANC.

Table 6 presents results of the expanded HSS in 1996 among three of the sentinel groups – FSW, soldiers and antenatal women. These data are presented to illustrate that, when HIV prevalence reaches levels of 40% or more, the sample size for HSS does not have to be several hundred per site. The smallest sample of FSW was 20 and seven HIV positives were detected in that sample. The sample sizes of antenatal women ranged from a low of 38 to a high of 452, but HIV was detected at all sites. These findings clearly show that HIV prevalence reached very high levels among FSW throughout Cambodia. In addition, a relatively high HIV prevalence was found in male clients of FSW (soldiers and police), some of whom are transmitting HIV to their wives and/or other regular sex partners.

**Table 6:** HIV sentinel surveillance results in selected provinces in Cambodia, 1996

Province	No. Tested	No. Pos.	% Pos.	No. Tested	No. Pos.	% Pos	No. Tested	No. Pos	% Pos
Siem Reap	100	49	49.00	50	2	4.00	248	4	1.61
Battambang	156	91	58.33	56	4	7.14	180	8	4.44
Rattanakiri	20	7	35.00	79	1	1.27	113	7	6.19
Kampong Cham	152	42	27.27	136	9	6.62	232	2	0.86
Prey Veng	91	27	29.67	109	8	7.34	452	6	1.33
Svay Rieng	69	25	36.23	105	4	3.81	325	3	0.92
Takeo	69	17	24.64	94	4	4.26	218	2	0.92
Kampot	77	32	41.56	52	4	7.96	208	4	1.92
Kratie	77	22	28.57	NA	-	-	350	1	0.29
Stung Treng	60	10	16.67	74	3	4.05	264	2	0.76
Kampong Chhnang	116	45	38.79	96	1	1.04	258	3	1.16
Kampong Speu	115	58	50.43	169	8	4.73	210	3	1.43
Pursat	103	51	49.51	93	13	13.98	174	4	2.30
Kandal	105	14	13.33	78	2	2.56	200	6	3.00
Sihanouk ville	99	51	51.52	52	9	17.31	95	2	2.11
Koh Kong	119	62	52.10	17	2	11.76	38	2	5.26
Banteay Meanchey	156	85	54.49	92	6	6.52	178	3	1.69
Phnom Penh	173	72	41.62	77	5	6.49	186	6	3.23
<b>TOTALS</b>	<b>1859</b>	<b>760</b>	<b>40.88</b>	<b>1429</b>	<b>85</b>	<b>5.95</b>	<b>3929</b>	<b>68</b>	<b>1.73</b>

Source: MOH Cambodia

The estimated national HIV prevalence in Cambodia reached a high of over 3% in 1997 and 1998, but HSS data for 1999 and 2000 indicate that HIV prevalence has peaked.

HIV sentinel surveillance (HSS) was started in Myanmar in 1992 with a total of nine sites where data were collected on FSW who were rounded up by the police, male STI patients, injecting drug users (IDU), and antenatal clinic attendees (ANC). HSS was expanded to 19 sites in 1994, 21 sites in 1997 and, starting in 2001, a total of 27 sites will be included.

Extensive HIV transmission probably started in Myanmar during the late 1980s since, by 1992, HIV prevalence was already over 60% among IDU and over 5% among FSW. The HIV pattern and prevalence found in Myanmar is very similar to that found in Thailand. However, a few major differences that began to develop after the mid-1990s should be noted.

- HIV prevalence peaked among direct and indirect FSW in Thailand starting around the mid-1990s and has been decreasing since. In Myanmar, a "100% condom programme" was started in a few townships late in 2000 and HIV prevalence rates among FSW have been continuing to increase in recent years.

- HIV prevalence among ANC in Thailand peaked at slightly over 2% around the mid-1990s and has been slowly declining to a level of about 1.5% in the year 2000, whereas no peaking has been noted in the Myanmar ANC trend.
- Military recruits in Thailand also appeared to have peaked in the mid-1990s, while no peaking has been seen for Myanmar army recruits.

All of the available HIV/AIDS data, including the results of HSS data, indicate that the peaking of HIV prevalence among FSW in Thailand was a direct result of the "100% condom programme". This public health intervention was started by the Thai AIDS Programme for FSW and their male clients during the early 1990s. A "100% condom programme" was started on a pilot basis in late 2000 in four townships in Myanmar, but it is too early for these pilot programmes to have had any measurable effect on HIV prevalence among FSW. The 2000 HSS findings in Thailand and Myanmar show how similar the HIV patterns and prevalence in these two countries are.

HSS systems in all the countries or areas in Asia currently classified as having high HIV prevalence were started at varying times after extensive HIV transmission began. However, from the available HSS data, the general HIV pattern and the median or mean HIV prevalence among FSW and ANC sentinel groups appear to be very similar, as shown in Figure 12. In Thailand, the most detailed and comprehensive HSS system was started in 1989, probably a few years after HIV had already started to spread among heterosexuals with the highest sexual risk behaviours. HIV prevalence among Thai FSW would likely have reached levels of 40% or higher had the 100% condom intervention not been started in Bangkok during the early 1990s. By the mid-1990s, HIV prevalence in Thailand had peaked at about 34% and has decreased markedly to below 20% by the late 1990s, although a possible levelling or increase occurred in 2000. As noted previously, HIV prevalence in Thai ANC populations also peaked around the mid-1990s at slightly over 2% and decreased to less than 1.5% in 2000.

In all the other high HIV prevalence countries/city, HIV prevalence in FSW have reached levels of close to 40% or higher. The HIV prevalence trend among FSW in Myanmar appears to be still increasing whereas, in both Cambodia and Mumbai, there is some suggestion that HIV prevalence may have peaked in their FSW populations. HIV prevalence in all of the ANC sentinel populations has appeared to be levelling or decreasing slightly during the last few years. Cambodia, which currently has the highest estimated HIV prevalence rate (2.8%) in Asia, has the highest ANC prevalence rate (close to 3%), whereas all the other high HIV prevalence populations in Asia have HIV prevalence rates of from 1.5% to a little over 2%.

All of these findings are consistent with an initial explosive increase of HIV prevalence from relatively small numbers of infected FSW to their more numerous male clients. Subsequently, infected male clients have transmitted their infection, to only a limited extent, to their regular sex partner(s). Thereafter, HIV penetration into the general heterosexual population has not continued at any measurable rate. The decreasing trend of HIV prevalence in FSW and ANC sentinel populations in Thailand is convincing support for the effectiveness of the 100% condom intervention strategy. However, decreasing HIV prevalence trends cannot be expected in other countries/areas until they fully implement the 100% condom programme for all commercial and casual sex encounters.

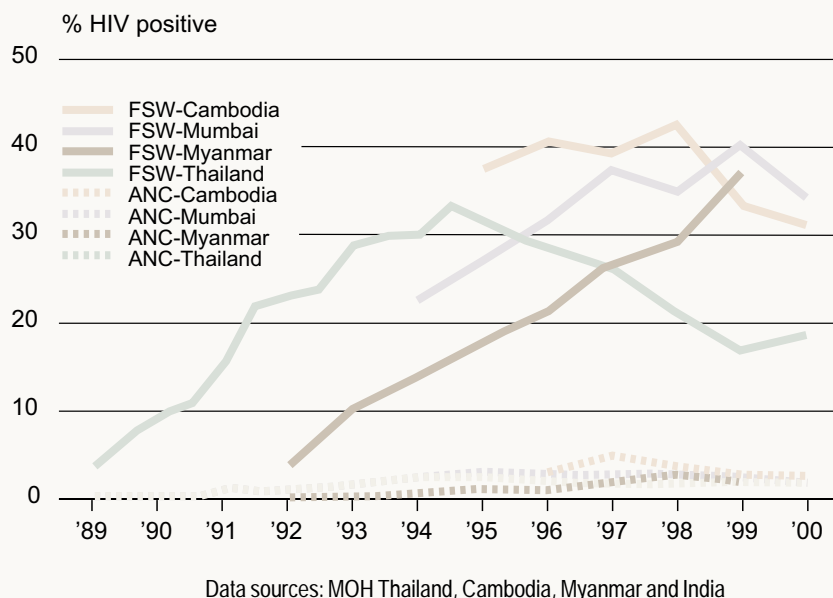
In low HIV prevalence countries, such as Indonesia and the Philippines, HIV infection was not found in large numbers of FSW during the 1990s. In the Philippines, annual HSS samples of about 300 FSW from 8-10 sentinel sites throughout the country have only detected occasional and sporadic HIV infections.

The limited HSS data from Indonesia have been similar to those found in the Philippines – a survey of close to 2000 FSW in the late 1990s from a few selected areas of Indonesia detected no HIV infection. In the Philippines and Indonesia, HIV prevalence in FSW continues, as



**Figure 12:**

HIV sentinel  
surveillance findings  
in high HIV  
prevalence  
populations



of 2001, to be low. These findings clearly indicate that extensive heterosexual HIV transmission has not occurred, even within the highest heterosexual RBG. However, the most recent HIV surveillance data from Indonesia for the years 1999-2000 indicate that HIV prevalence rates are rising rapidly among IDU populations throughout the country and HIV prevalence is now detectable (1-5%) in several FSW populations.

HSS data from the Philippines are adequate to conclude that extensive transmission of HIV has not occurred in the country. If HIV prevalence in FSW in the Philippines were a few percent or more, then even the most limited HSS system would be able to detect such a prevalence level. The 1996 HSS findings in Cambodia (Table 2), show very clearly that HIV prevalence levels of 1-2% in ANC females were readily detected with relatively small sample sizes. The fact that sample sizes of about 300 FSW from sentinel sites in the Philippines have not detected many HIV infections should be considered adequate to conclude that HIV has not yet spread extensively in the highest heterosexual RBG – FSW and their male clients.

In many developed countries, HIV seroprevalence in MSM and IDU reached more than 10% within a few years after initial introduction, whereas in the same areas, HIV prevalence in the highest-risk heterosexuals (FSW and their clients) are still virtually undetectable or are not consistently found. HSS, as designed by WHO/GPA during the late 1980s, has been a relatively reliable method for monitoring the general patterns and trends of HIV infection. HSS can provide an early warning alert of HIV transmission in the highest HIV RBG, and can also provide a very rough measurement of overall HIV prevalence in these RBG. HSS was not designed for making estimates of national HIV prevalence. However, HSS data are sufficiently reliable to confidently estimate HIV prevalence rates in the 15-49 year-old population to be very low (less than 0.1%) or high (more than 1%).

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**ISBN** 929061 158 8